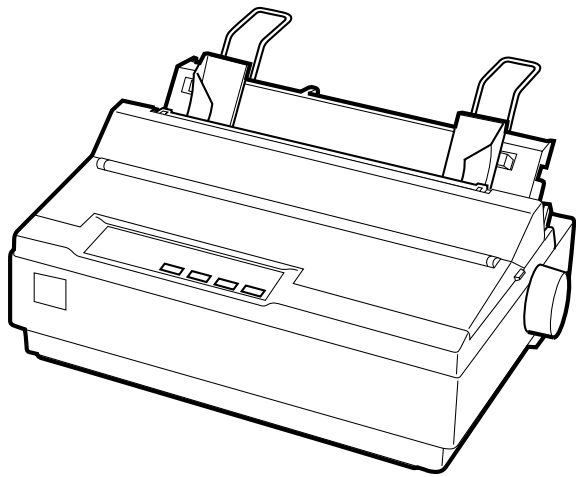# Service Manual

EPSON® LX-300+

9-pin Serial Impact Dot Matrix Printer

EPSON®

LX-300+ Dot Matrix Printer
Service Manual

Copyright Notice

Trademark Information

FCC Compliance Statement for American Users

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio and television reception.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio and television reception, which can be determined by turning the equipment on and off, the user is encouraged to try to correct the interface by one or more of the following measures:

❑ Reorient or relocate the receiving antenna.

❑ Increase the separation between the equipment and receiver.

❑ Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

❑ Consult the dealer or an experienced radio/television technician for help.

Warning

The connection of a non-shielded equipment interface cable to this equipment will invalidate the FCC Certification of this device and may cause interference levels that exceed the limits established by the FCC for this equipment. It is the responsibility of the user to obtain and use a shielded equipment interface cable with this device. If this equipment has more than one interface connector, do not leave cables connected to unused interfaces.

Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the printer.

For Canadian Users

This Class B digital apparatus meets all requirements of the Canadian Interface-Causing Equipment Regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le materiel brouilleur du Canada.

Guide to Using This Manual

Symbols Used in This Manual

Before servicing the EPSON LX-300+, read the precautions on the following page. Then turn to one of these chapters:

WARNING

Warnings **must be followed to avoid personal injury or death.**

Chapter 1. **Product Basics**
Lists the main features of the product and describes basic control panel operations.

CAUTION

Cautions **must be followed to avoid damaging the product.**

Chapter 2. **Technical Overview**
Explains how the product works.

Chapter 3. **Troubleshooting**
Tells how to identify and correct common problems.

REASSEMBLY

Reassembly **notes provide helpful tips for reassembly.**

Chapter 4. **Disassembly and Assembly**
Provides step-by-step instructions for disassembling the product.

Chapter 5. **Adjustments**
Provides instructions for adjusting the platen gap and bi-directional print alignment.

Chapter 6. **Maintenance**
Describes routine maintenance procedures.

Chapter 7. **Appendix**
Provides additional information for reference:
- Detailed specifications
- Connector pin assignments
- Electrical diagrams
- Parts list
- Exploded diagrams

General Precautions

WARNING

- When servicing, unplug the unit from the power outlet and disconnect any attached devices.

- Never touch the primary parts of the power supply (including the heat sink) when the unit is plugged in. Its primary circuitry remains live whenever it is plugged in.

- No work should be performed on the unit by persons unfamiliar with basic safety measures familiar to trained electronics technicians.

- When performing testing or troubleshooting procedures in this manual, do not connect the unit to a power source until instructed to do so. When the power supply cable must be connected, use extreme caution in working on the power supply board and other electronic components.

CAUTION !

- Repairs on EPSON products should be performed only by an EPSON-certified repair technician.

- Make certain that the source voltage is the same as the rated voltage listed on the serial number plate. If the unit has a primary AC rating different from the available power source, do not connect it to the power source.

- Always verify that the unit has been disconnected from the power source before removing or replacing printed circuit boards and other components.

- To protect sensitive microprocessors and circuitry, use static discharge equipment, such as anti-static wrist straps, when accessing internal components.

- Always replace malfunctioning components with EPSON components. Introduction of second-source ICs or other non-approved components may damage the product and void any applicable EPSON warranty.

Contents

PRODUCT BASICS

1.1 Features

The EPSON LX-300+ is a 9-pin serial impact dot matrix printer. Its major features include:

❑ Printing speed: High speed draft   300 cps at 10 cpi
                       Draft   225 cps at 10 cpi
                       NLQ   56 cps at 10 cpi

❑ Feeding method: Friction feed (rear)
                       Push tractor feed (rear)
                       Push and Pull tractor feed (rear)
                       Pull tractor feed (rear, bottom)

❑ Feeder: Standard: Rear push tractor
                       Optional: Cut sheet feeder bin, Pull tractor, and
                       Roll paper holder

❑ Paper/ Media: Single sheets, Continuous paper, Multi-part forms,
                       Envelopes, Labels, and Roll paper

❑ Fonts: 2 NLQ and 1 Draft Bitmap typefaces
                       8 Barcode fonts

❑ Character tables: Standard version   13 tables
                       NLSP version   38 tables

❑ Input buffer: 8 Kbytes

❑ Acoustic noise: 49 dB(A) (ISO 7779 pattern)

❑ Reliability: Total print volume   12 million lines
                                            (except printhead)
                       MTBF   6000 POH (25% Duty)
                       Printhead life   200 million strokes per pin
                       Ribbon life   3 million characters

❑ Interface: Bi-directional parallel interface
                       (IEEE-1284 nibble mode supported)
                       Serial I/F

❑ Control code: ESC/P and IBM 2380 Plus emulation

❑ Copy capability: 1 original + 4 copies
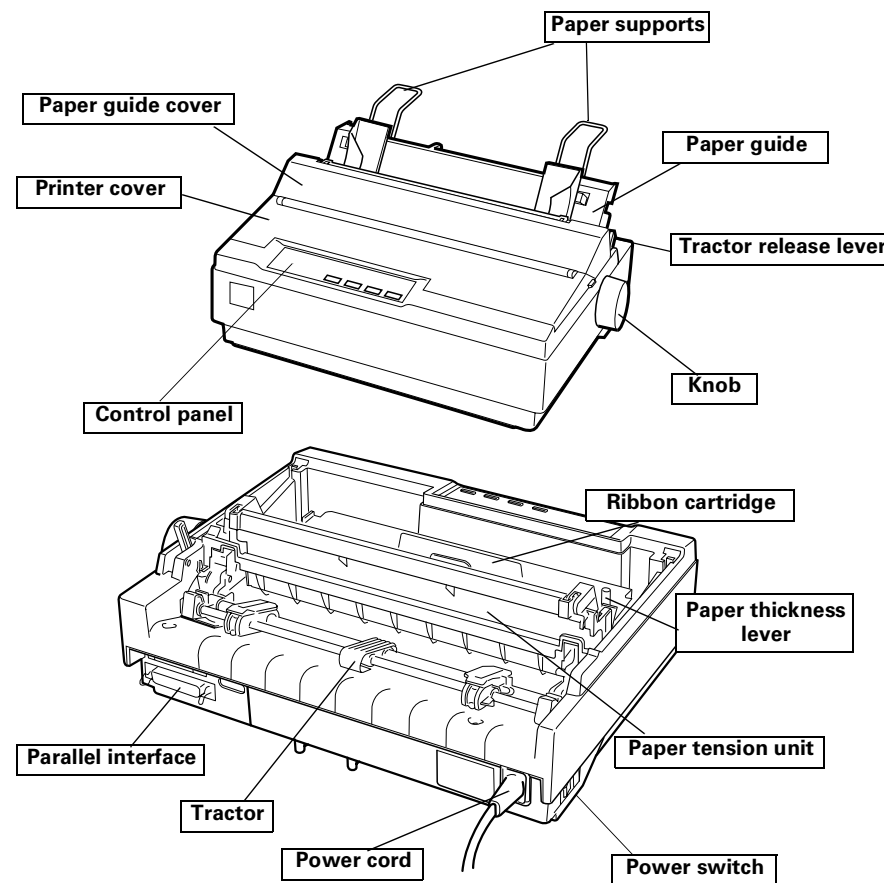
Figure 1-1. EPSON LX-300+ Printer Parts

1.2 Control Panel Operation

1.2.1 Control Panel

The control panel includes four switches and four LEDs:

Font Indicator LEDs
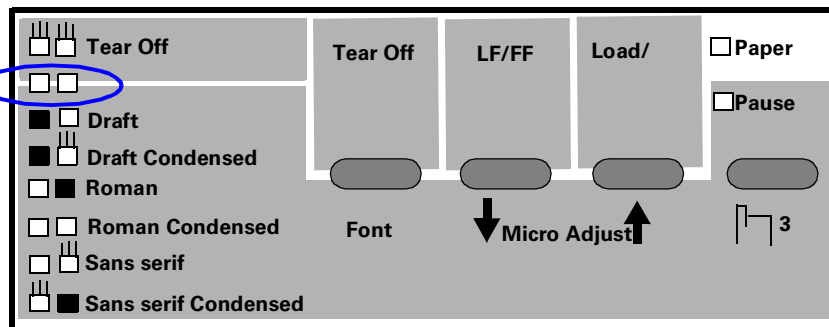
☐: **LED On**   ⊟ : **LED Blinks**   ■: **LED Off**

Figure 1-2. Control Panel

1.2.1.1 Switches

❑ Operation in normal mode

Table 1-1. Operation in Normal Mode

Button	Function
Pause	• Pauses printing • Enables Micro Adjust and Font selection (held down for 3 seconds)
Load/Eject	• Loads or ejects paper • Executes micro feed forward (0.118 mm or 1/216 inch) when this function is enabled
LF/FF	• Executes line feed (pressed momentarily) • Executes form feed (held down for 3 seconds) • Executes micro feed backward (0.118 mm or 1/216 inch) when this function is enabled
Tear Off	• Advances continuous paper to the Tear-off position; pressing it a second time returns paper to TOF • Selects font, when this function is enabled

❑ Operation at power on

Turning the printer on while pressing these buttons executes the following functions:

Table 1-2. Operation at Power On

Button	Function
Load/Eject	NLQ self test
LF/FF	Draft self test
Tear Off	Enters default setting mode
Load/Eject & LF/FF	Data dump

Table 1-2. Operation at Power On (continued)

Button	Function
Load/Eject & LF/FF & Pause	Clear EEPROM (returns printer to factory default settings) NOTE: Factory default settings aren't necessarily correct for your market; use only if necessary.
Tear Off & Load/Eject & LF/FF	Clear ribbon usage counter (stored in EEPROM)
Pause	Perform Bi-D adjustment (see page 17 and page 60)

❑ Operation in default setting mode

Default setting mode is entered by holding down the Tear Off button and turning the printer on. The following buttons are used in default setting mode:

Table 1-3. Operation at Power On

Button	Function
Tear Off	Changes the setting
LF/FF	Selects the Menu

For more information, see "Default Setting Mode" on page 16.

1.2.1.2 Indicator Lights (LEDs)

The Pause and Paper Out lights indicate these conditions:

Table 1-4. Printer Status

Printer Status	Pause	Paper Out
Pause	On	---
Paper out error	On	On
Release lever error	On	---
Paper eject warning	On	Blink
Micro Adjust	Blink	---

When all four lights are blinking, the printer has a fatal error (caused by a carriage control or power supply failure).

When both Font lights blink, paper is in the tear-off position. When the paper is positioned for printing, the Font lights indicate the currently selected font:

- ■□: Draft
- ■★: Draft Condensed
- □■: Roman
- □□: Roman Condensed
- □★: Sans serif
- ★■: Sans serif Condensed
- ★★: Tear Off

(□: LED On, ■: LED Off, ★: LED Blinks)

1.2.1.3 Beeper

❑ Paper out error: three beeps

❑ Release lever operation: three beeps

❑ Illegal panel operation: one short beep

1.2.2 Default Setting Mode

You can change the printer's default settings by following these steps:

1. Turn the printer on while pressing Tear Off. The printer prints a set of instructions.

2. Follow the printed instructions to change these default settings (standard factory settings are underlined):

Table 1-5. Default Settings

Item	Setting / Value *2
Page length for tractor	3 inch, 3.5 inch, 4 inch, 5.5 inch, 6 inch, 7 inch, 8 inch, 8.5 inch, <u>11 inch</u>, 70/6 inch, 12 inch, 14 inch, 17 inch
Skip over perforation	<u>OFF</u>, ON
Auto tear off	<u>OFF</u>, ON
Auto line feed	<u>OFF</u>, ON
Print direction	<u>Bi-d.</u>, Uni-d., Auto
Software	<u>ESC/P</u>, IBM 2390 Plus
0 slash	<u>OFF</u>, ON
High speed draft	OFF, <u>ON</u>
I/F mode	<u>Auto</u>, Parallel, Option
Auto I/F wait time	<u>10 seconds</u>, 30 seconds
Parallel I/F bidirectional mode	OFF, <u>ON</u>
Packet mode	<u>Auto</u>, OFF
Auto CR (IBM 2390 Plus)	<u>OFF</u>, ON
A.G.M. (IBM 2390 Plus)	<u>OFF</u>, ON

Table 1-5. Default Settings (continued)

Item	Setting / Value *2
Character table	Software version Italic, <u>PC437</u>, PC850, PC860, PC863, PC865, PC861, BARASCII, Abicomp, Roman8, ISO Latin 1, PC858, ISO 8859-15
	NLSP version Italic, <u>PC437</u>, PC850, PC437, Greek, PC853, PC855, PC852, PC857, PC864, PC866, PC869, MAZOWIA, Code MJK, ISO 8859-7, ISO Latin 1T, Bulgaria, PC774, Estonia, ISO 8859-2, PC 866 LAT., PC 866UKR, PC APTEC, PC708, PC720, PCAR 864, PC860, PC865, PC861, PC863, BRASCII, Abicomp, Roman8, ISO Latin 1, PC858, ISO 8859-15, PC771
International character set for Italic table	<u>Italic U.S.A.</u>, Italic France, Italic Germany, Italic, U.K., Italic Denmark 1, Italic Sweden, Italic Italy, Italic Spain 1
Manual feed wait time	1 second, <u>1.5 seconds</u>, 2 seconds, 3 seconds
Buzzer	OFF, <u>ON</u>
Auto CR (IBM 2380 Plus)	<u>OFF</u>, ON
IBM character table	<u>Table2</u>, Table1

1.2.3 Bi-D Adjustment

Users can perform the bi-directional adjustment themselves if they notice jagged characters or misaligned vertical lines. Follow these steps:

1. Turn the printer on while pressing Pause. The printer prints a set of instructions along with the first alignment pattern.

2. Follow the printed instructions to adjust the alignment for each of the following print speeds:

   ■ high speed draft mode

   ■ draft mode

   ■ NLQ mode

3. Turn the printer off.
   The settings are stored in the printer's memory.

To perform the Bi-D adjustment using the adjustment program, see page 60.

1.3 Accessories

Table 1-6. Consumables

Item	Description
Ribbon cartridge (Black)	#8750
Ribbon pack (Black)	#8758
Ribbon cartridge (Color)	S015073

Table 1-7. Options

Item	Description
Cut sheet feeder	C806371
Pull tractor unit	C800301
Roll paper holder	#8310
Color upgrade kit	C832081

C H A P T E R

2

TECHNICAL OVERVIEW

2.1 Printer Mechanism

The printer's main components are shown below:
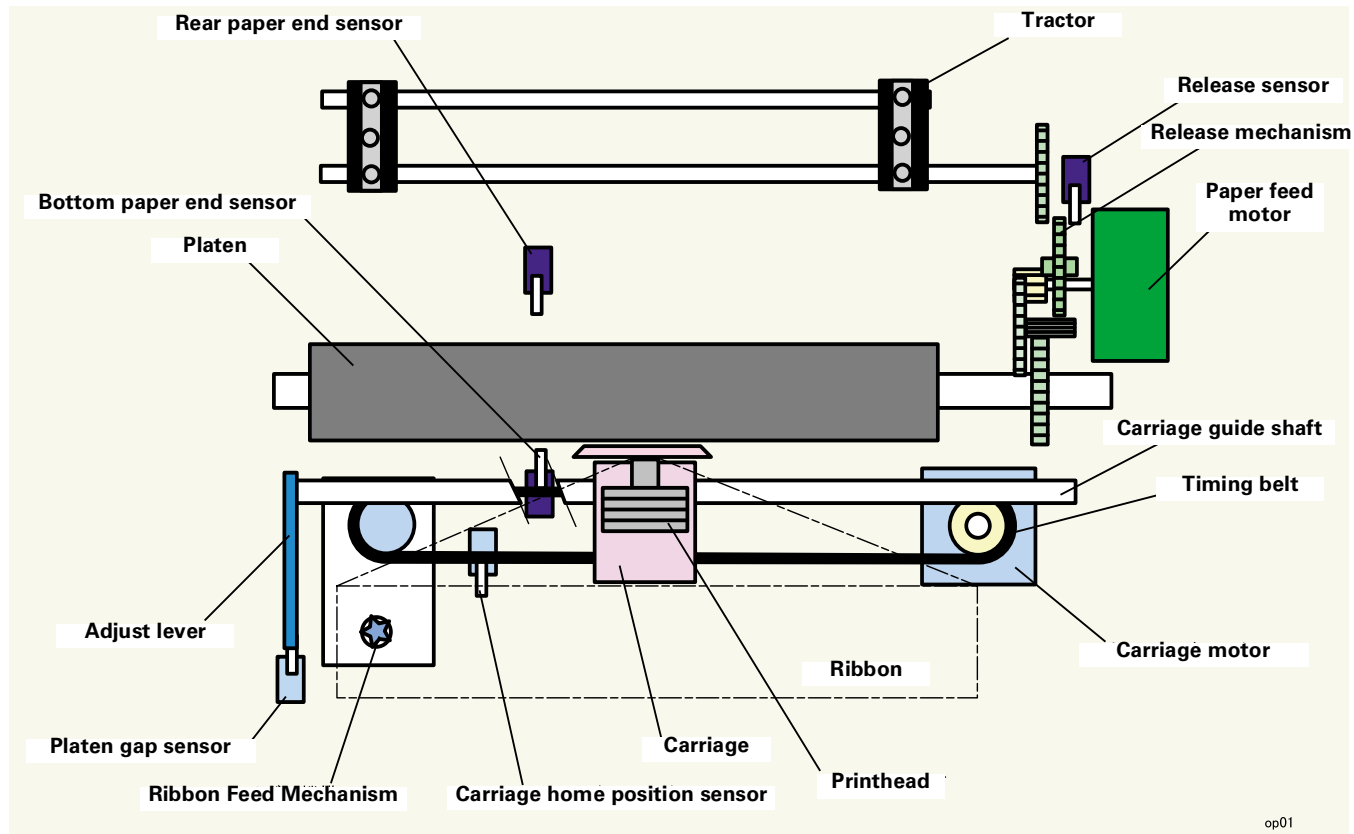
Figure 2-1. Printer Mechanism Block Diagram

2.1.1 Printhead

The printhead's pins are configured as shown below. (The view is from behind the printhead, facing the platen.)
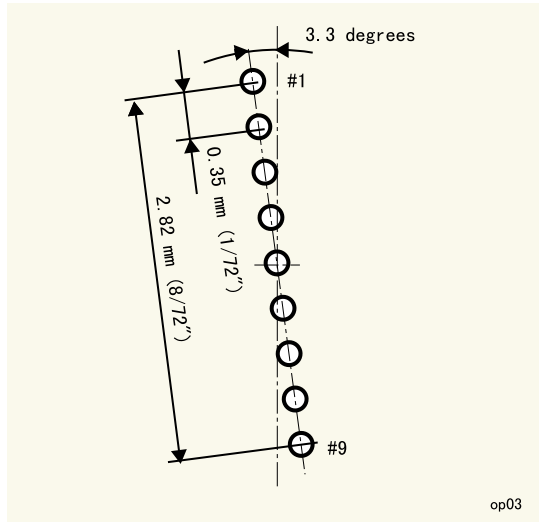
Figure 2-2. Pin Configuration

The table below indicates printhead specifications:

Table 2-1. Printhead Specifications

Item	Specification
Number of pins	9
Pin diameter	0.29 mm
Coil resistance	33.3 ±3.3 Ω (25°C)
Head drive voltage	35 +2.1/-3.5 V
Peak current	• Normal: 0.75 A (Standard) • Copy: 0.85 A (Standard) 1.0 A (Maximum)
Head drive frequency	• Normal: 1350Hz or less • Copy: 1350Hz or less
Head life	• Black ribbon: 0.2 billion stroke per pin or more • Color ribbon: 0.1 billion strokes per pin or more
Environmental conditions	• Temperature: 5 to 55°C • Humidity: 10 to 85%

The printhead also works as the printer's beeper; to generate sound, the driver causes the pins to vibrate at a high frequency.

Table 2-2. Beeper Drive Specifications

Item	Specification
Head voltage	35 +2.1/-3.5 V
Drive frequency	2 KHz, 1.5KHz

2.1.2 Carriage Mechanism

Home Position Sensor

The printer uses a mechanical contact switch to determine when the carraige is at home position (on the left side of the printer). The switch is OPEN when the carriage is in home position, and CLOSED when away from home position.

Carriage Motor

This printer uses a DC stepper motor.

Table 2-3. CR Motor Specifications

Item	Specification
Motor type	2-phase, 200-pole hybrid stepper motor
Coil resistance	5.7 Ω ±10% (25°C)
Control method	Bi-polar drive
Phase drive	2-2 phase, 1-2 phase, W1-2 phase
Drive voltage	36.75 ±1.75 V
CR feed pitch	Minimum Resolution: 0.212 mm (1/120") (1-2 phase, 2 pass)

Under certain conditions, the carriage can move at different speeds. For example, when printing on thicker paper such as multipart forms, the carriage slows to avoid breaking off printhead pins. When printing blank areas of the page, the carriage speeds up.

The table on the following page indicates the various speeds at which the carriage travels.

The following table indicates the various carriage speed modes:

Table 2-4. Carriage Speed Modes

Carriage speed mode	CR drive frequency [Hz]	Printing mode	Phase drive [pps]	Current limit (A/phase)					Adjacent dot resolution [dpi]	Head drive frequency [Hz]	Printing speed	Carriage speed mode at power down	High or low speed printing
				Front rush	High speed	Normal speed	Low speed	Rear rush					
A	3600	Color	2-2	0.79	0.79	0.70	0.70	0.70	45	1350	High speed draft 10cpi	C	high
		BW	2-2	0.70	0.59	0.59	0.59	0.59					
B	3375	Color	2-2	0.79	0.79	0.70	0.70	0.70	48	1350	High speed draft 12cpi	E	high
		BW	2-2	0.70	0.59	0.59	0.59	0.59					
C	2700	Color	2-2	0.79	0.79	0.70	0.70	0.70	60	1350	High speed draft 15cpi Draft 10cpi Bit image 60 dpi	F	high
		BW	2-2	0.70	0.59	0.59	0.59	0.59			Draft 12cpi		
D	2250	Color	2-2	0.79	0.79	0.70	0.70	0.70	1440/21	1286	High speed draft 17cpi	F	high
		BW	2-2	0.70	0.59	0.59	0.59	0.59	72	1350	Bit image 72 dpi		
E	1800	Color	2-2	0.79	0.79	0.70	0.70	0.70	80	1200	Bit image 80 dpi	G	low
		BW	1-2	0.65	0.65	0.59	0.59	0.59	90	1350	High speed draft 20cpi Draft 15cpi Bit image 90 dpi		
F	1350	Both	1-2	0.65	0.65	0.59	0.59	0.59	120	1350	Draft 20/17cpi NLQ 10cpi Bit image 120 dpi	I	low
G	1125	Both	1-2	0.65	0.65	0.59	0.59	0.59	144	1350	Bit image 144 dpi	I	low
H	900	Both	1-2	0.65	0.65	0.59	0.59	0.59	180	1350	NLQ 15cpi	I	low
I	675	Both	1-2	0.65	0.65	0.59	0.59	0.59	240	1350	NLQ 17/20cpi	J	low
J	450	Both	1-2	0.65	0.65	0.59	0.59	0.59				-	low

2.1.3 Color Ribbon Mechanism (Optional)

The color ribbon mechanism (color shift, or CS, mechanism) shifts the color ribbon up and down to change the color area of the ribbon.

The mechanism includes a sensor (mechanical contact switch) to detect the presence of a ribbon cartridge. If one is installed, the output is HIGH; if not installed, the output is LOW.

To avoid unwanted mixing of colors, composite colors are applied in a specific order. The following table shows how green, violet, and orange are composed:

Table 2-5. Color Printing Order

Composite Color	First color	Second color
Green	Yellow	Cyan
Orange	Yellow	Magenta
Violet	Magenta	Cyan

The color ribbon mechanism uses a stepper motor with these specifications:

Table 2-6. Color Shift Motor Specifications

Item	Specification
Motor type	2-phase, 48-pole PM stepping motor
Coil resistance	150 Ω ±5% (25°C, per 1 phase)
Control method	uni-polar rated voltage drive
Phase drive	2-2 phase
Drive voltage	36.75 ± 1.75 VDC
Consuming current	• Operating, peak current: 245 mA • Non-operating: 20 mA
Drive frequency	500 pps

Ribbon Initialization

During printer initialization, the ribbon is positioned for black printing. At the same time, the carriage moves to prevent the ribbon from getting caught on it. This initialization also takes place when the print buffer clears or the printer is paused.
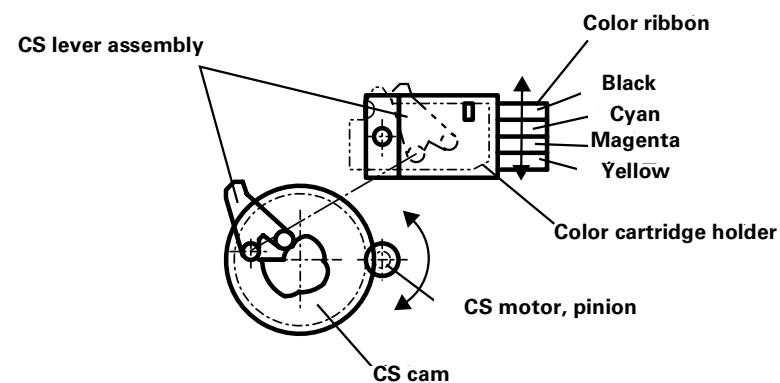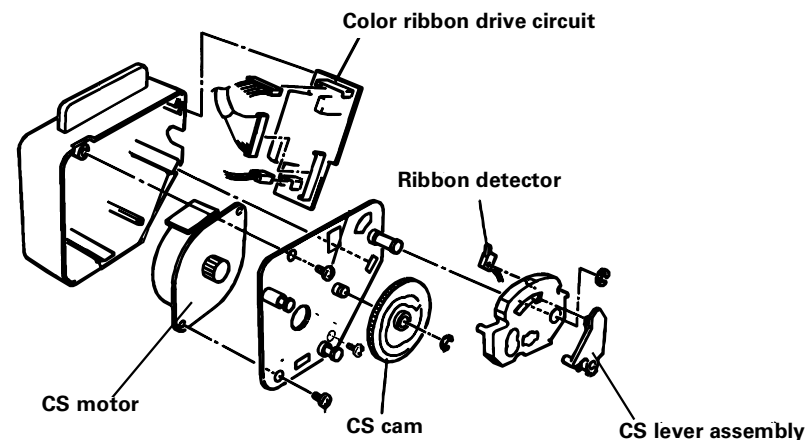
op04

Figure 2-3. Color Ribbon Mechanism

2.1.4 Platen Gap Adjustment Mechanism

The platen gap lever changes the distance between the printhead and the platen. This lets the printer print on thicker paper.

When printing on thick paper or multipart forms, the lever is set to position 1, 2, 3, or 4. The lever trips the platen gap sensor (a mechanical contact switch) and causes the carriage to move at a slower speed; this prevents printhead pins from getting lodged in the paper and breaking off.

Table 2-7. PG Sensor Specifications

Item	Specification
Electrical rating	0.6 to 1.0 mA, 5 V ±5%
Switching mode	• PG=0: closed • PG=1-4: open
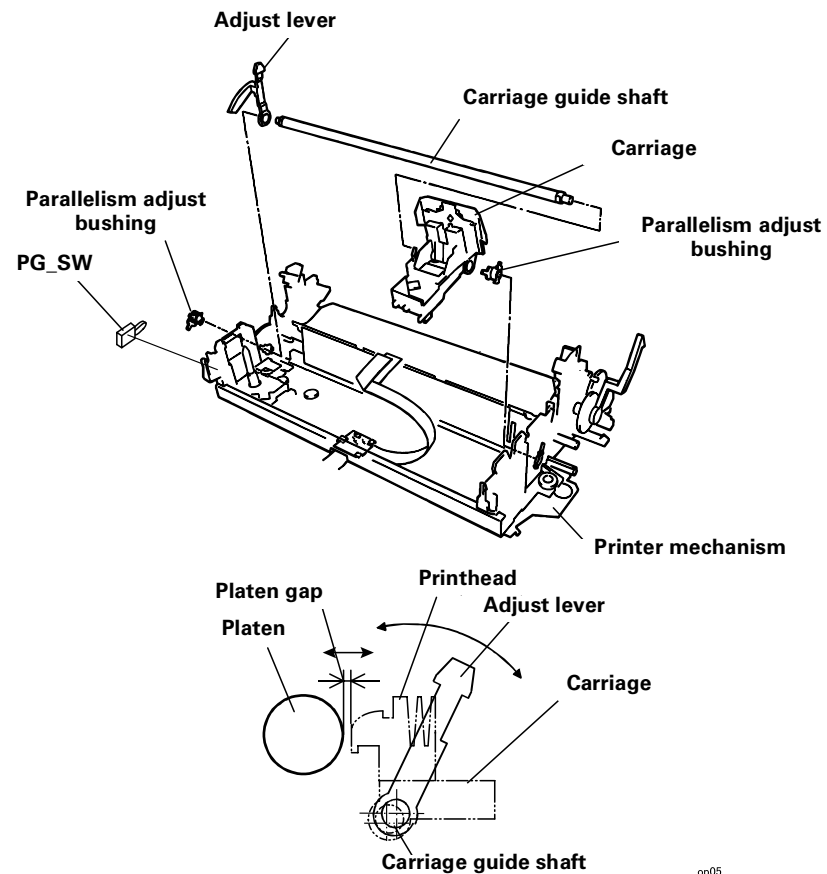
Figure 2-4. Platen Gap Adjustment Mechanism

2.1.5 Paper Feed Mechanism

The are two standard ways of feeding paper through the printer: by friction feeding and by using the push tractor.

❑ When friction feeding, set the tractor release lever to cut sheet paper. When you insert the paper into the rear loading slot, the RPE sensor detects the paper and the printer automatically advances it to the TOF position.

❑ When using tractor feeding, set the tractor release lever to the tractor position. The paper feed motor disengages from the paper feed rollers and transfers drive to the tractor. The mechanism is shown below:
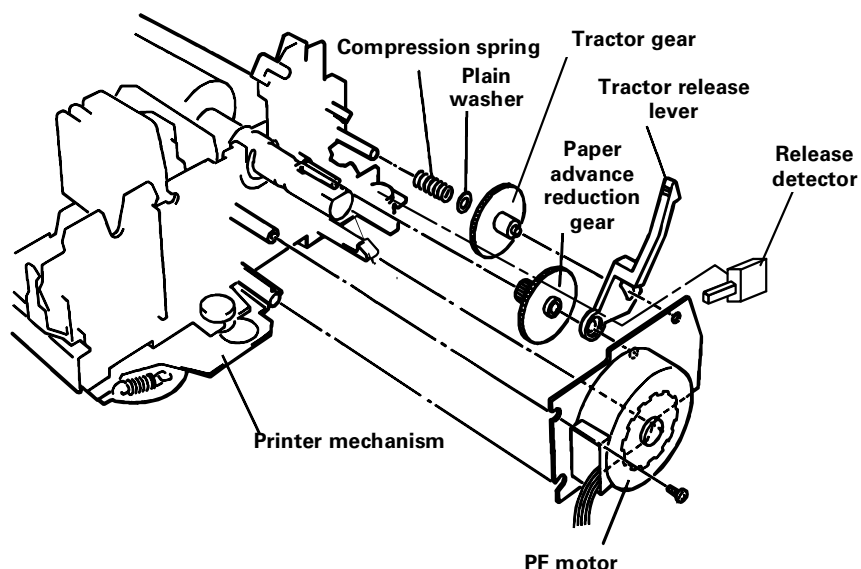
Figure 2-5. Tractor Release Mechanism

Standard feeding methods allow continuous forms to be fed through the rear loading slot, using either friction or push-tractor feeding; or cut sheet paper can be fed through the top loading slot, one sheet at a time, using friction feeding. Other feeding methods include using the optional cut sheet feeder, pull tractor unit, and roll paper holder.

The paper feed motor has the following specifications:

Table 2-8. PF Motor Specifications

Item	Specification
Motor type	2-phase, 96-pole hybrid stepper motor
Coil resistance	16.0 Ω ±10% (25°C)
Control method	Bi-polar rated current drive
Phase drive	1-2 phase, W1-2 phase
Drive voltage	36.75 ±1.75 VDC
Drive current	0.1 to 0.9A
Paper feed pitch	Minimum Resolution: 0.059 mm (1/432") (1-2 phase, 2 pass)

The printer includes two sensors to detect the end of the paper: the RPE sensor detects paper fed through the rear paper slot; the BPR sensor detects paper fed through the bottom paper slot. The sensors have the following specifications:

Table 2-9. RPE and BPE Sensor Specifications

Item	Specification
Type	Mechanical contact switch
Electrical rating	0.6 to 1.0 mA, 5 VD±5%
Switching mode	• Paper inside: open • No paper: closed

The printer also uses a sensor (a contact switch) to detect the position of the tractor release lever. When friction feeding, the switch is OPEN; when tractor feeding, the switch is CLOSED.

2.2 Electronics

2.2.1 Main Board

The components of the main board are diagrammed below and explained on the next page.
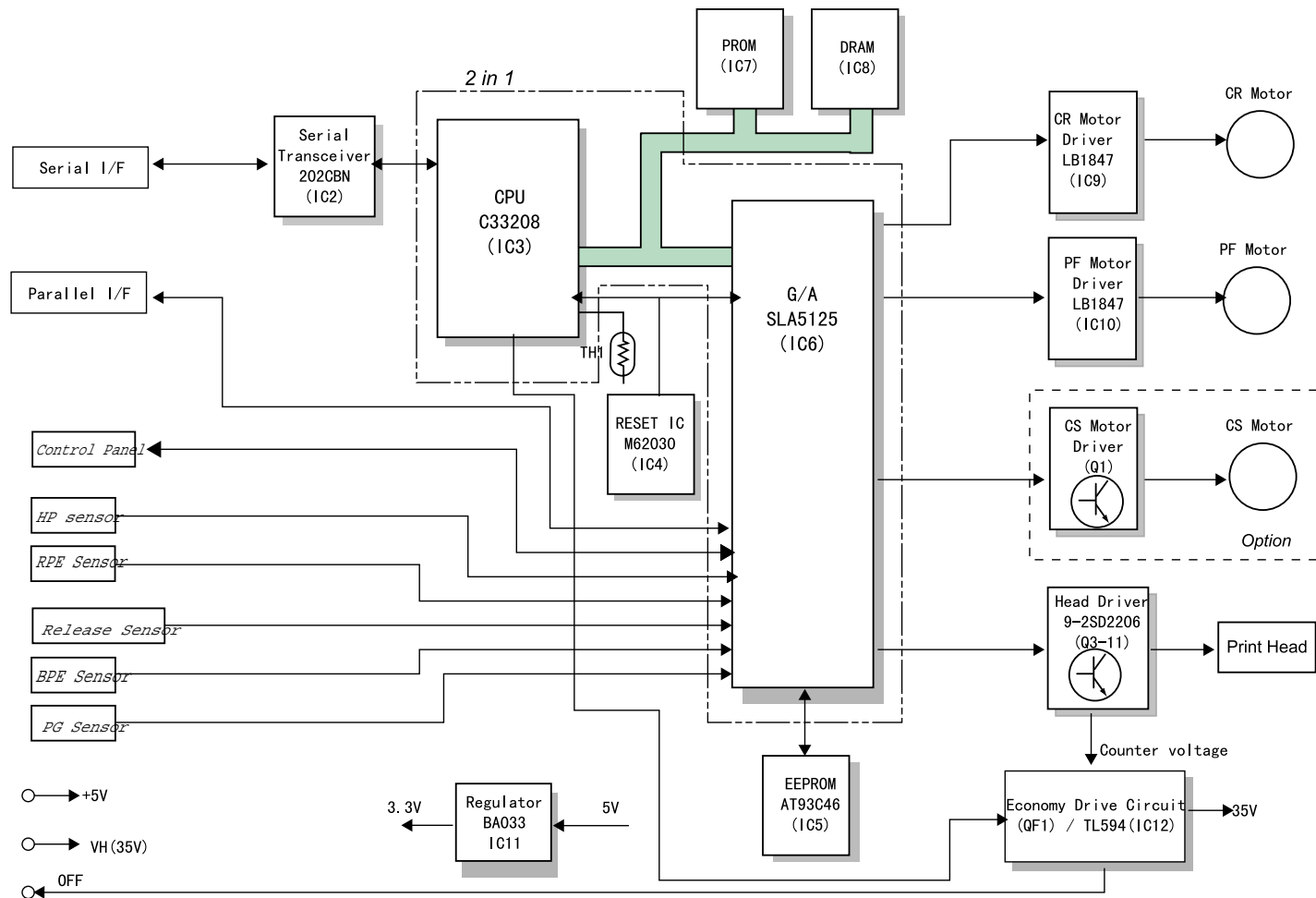
Figure 2-6. Main Board Block Diagram

Table 2-10. Main Board Components

Elements	Location	Function
CPU	IC3	RISC C33208 CPU, QFP 128 pin • Outside clock 19.66 MHz Inside clock 39.32 MHz • 8KB RAM built-in • DMA • A/D converter
G/A *	IC6	Approximately 21000 gates, QFP 160 pin • Bit manipulation • Clock control • Interface control (IEEE1284/Type-B I/F) • Input Buffer control • Motor control • Head control
PROM	IC7	4M / 8Mbit, DIP 40 / 42 pin • Stores firmware • CG
DRAM	IC8	1/2/4M bit switching method, SPJ package 40 pin • Processing buffer
EEPROM	IC5	AT93C46, 1kbit, SOP 8pin • Stores default values and other parameters
RESET IC	IC4	M62030 (SANYO), 8 pin • CPU and G/A reset
CR Motor Driver	IC9	LB1847 (SANYO)
PF Motor Driver	IC10	LB1847 (SANYO)
Serial I/F Transceiver	IC2	HIN202CBN or equivalent
Regulator IC	IC11	BA033 (ROHM) or equivalent • Generates 3.3V logic voltage
Regulator IC	IC12	PD494 or equivalent • 95V rated voltage circuit • Detects over voltage (over 150V) and sends OFF signal to the power supply boards.
Thermistor	TH1	Measures temperature of the motor driver.

* CPU and G/A will be combined in a later version.

2.2.2 Power Supply Board

The EPSON LX-300+ uses one of two power supply boards: C294PSB (100-volt model) and C294PSE (200-volt model). The table below shows the power supply boards' input voltage specifications:

Table 2-11. Input Voltage Specifications

Circuit	Input voltage	Fuse specification
C294PSB	99 - 132VAC	ULTSC-2.5A-NI
C294PSE	198 - 264VAC	HT 1.25A

Each power supply board supplies power at two voltage levels, as shown below:

Table 2-12. Output Voltage

Output voltage	Usage
35 V +5%/-10%	Motor drive
5 V ± 5%	Logic circuits

Note that the core voltage of the CPU and G/A on the main board is actually 3.3 volts. This is stepped down from 5 volts using a local regulator built onto the main board.

2.2.3 Initialization

Printer initialization can be performed in the following ways:

❑ Power-on initialization

This initialization is activated by a power-on or cold-reset command (remote RS command). Purpose:

- ■ to initialize the printer mechanism

- ■ to execute Operator initialization

❑ Operator initialization

This initialization is activated by the -INT signal (negative pulse). Purpose:

- ■ to clear all buffers of data

- ■ to cancel the download character definition

- ■ to put the printer in stand-by mode, if no errors occur

- ■ to execute Software initialization

❑ Software initialization

This initialization is activated by the control code ESC@. Purpose:

- ■ to clear the unprinted data

- ■ to set the printer's default settings

2.2.4 Other Special Functions

Energy Saving Mode

This function saves electricity when the printer is in standby mode. Normally, the PF motor, CR motor, and CS motor are kept stationary by a holding current. In energy saving mode, this current is turned off.

Quiet Mode

Quiet mode lowers printing temperature. When this mode is selected, the carriage speed slows to the power down mode speed. See Table 2-4, "Carriage Speed Modes," on page 24.

TROUBLESHOOTING

3.1 Overview

Follow these steps to troubleshoot the printer:

1. Before performing component-level troubleshooting, check the printer as described in **Printer Self-Diagnostics on page 33**.

2. Then turn to **Troubleshooting by Printer Symptoms on page 34** as needed for further information.

If you need to check individual components such as motors, sensors, or the printhead, follow the instructions in **Test Points on page 37**.

3.1.1 Precautions

WARNING
- **Always unplug the printer before servicing.**
- **Bear in mind that the printhead and motors may be hot after printing.**

CAUTION
- **Use the tools specified in chapter 4 when disassembling the printerChapter .**
- **Lubricate the printer as needed, using only the specified oil and grease. (See Maintenance on page 65.)**
- **After replacing parts, be sure to perform any indicated adjustments.**

3.2 Printer Self-Diagnostics

The printer can provide diagnostic information in two ways:

- ❏ using its LEDs
- ❏ by printing a self-test

Refer to the sections below to test the printer.

3.2.1 Indicator LEDs

The LEDs display the printer's condition, as shown below:

Table 3-1. Indicator LEDs

Printer Condition	Pause	Paper Out	Font LEDs (2)	Beeper
Pause	ON	—	—	—
Paper Out Error	ON	ON	—	Three beeps
Release Lever Error	ON	—	—	Three beeps
Paper Eject Warning	ON	BLINKS	—	—
Micro Adjust	BLINKS	—	—	—
Tear Off	—	—	BLINK	—
Fatal Error	BLINKS	BLINKS	BLINK	—

The **release lever error** occurs when the wrong release lever position is selected. For example, if you change the release lever setting after the printer has already started feeding paper, this error will occur.

A **fatal error** can occur if:

- ❏ carriage movement is impeded
- ❏ the power supply voltage is abnormal
- ❏ other hardware problems exist

3.2.2 Self-Test

To perform a self-test, make sure paper is loaded in the printer and positioned in the TOF position. Then hold down the LF/FF button while turning the printer on. This prints a self-test in draft mode.

A series of characters prints line-by-line. If it prints correctly, the problem may lie with the host computer or printer software. If it fails to print, the problem is most likely with the printer itself; continue on to the next section to take further troubleshooting steps.

3.3 Troubleshooting by Printer Symptoms

Find the printer's symptom below and check the referenced table on the following pages:

❑ No power (the printer doesn't operate and the LEDs don't come on)

See **Table 3-2** on page 35

❑ Fatal error (all LEDs blinking)

See **Table 3-3** on page 35

❑ Self-test doesn't print correctly (faint or badly printed characters)

See **Table 3-4** on page 36

❑ Paper doesn't feed properly

See **Table 3-5** on page 36

❑ Control panel doesn't work properly (switches or LEDs don't work)

See **Table 3-6** on page 37

❑ Self-test okay, but online printing is abnormal

See **Table 3-7** on page 37

Table 3-2. No Power

Possible Problem	Y/N	Solution
Is a fuse on the power supply board blown out?	YES	With the printer off, disconnect the power supply from CN8 on the main board. Replace the fuse and turn the printer back on. If the fuse blows again, replace the power supply board. If the fuse doesn't blow, check for problems with the printhead, printhead driver transistors, PF motor, and CR motor. (See **Test Points** on page 37.) If these components check out okay, replace the main board.
Are connectors connected to the power supply board properly?	NO	Reconnect them.
Is the power supply properly connected to CN8 on the main board?	NO	Connect CN8 properly.
Test the power switch. Is conductivity of the switch is OK?	NO	Replace the switch.
Test the power supply board for the proper output. To do this, disconnect CN8 on the main board. Pin 9 is the ground. Is the output 5 V at pin 8 and 35 V at pin 1?	NO	Replace the power supply board.
Is the control panel connected properly to the main board?	NO	Connect the harness properly.
—	—	Replace the control panel.

Table 3-3. Fatal Error

Possible Problem	Y/N	Solution
Does the carriage move?	NO	Check to make sure the carriage motor harness is connected properly to CN10 on the main board. If that's not the problem, test the CR motor and replace it if necessary. (See **Test Points** on page 37.) Otherwise, replace the main board.
Does the carriage move before the printer displays a fatal error?	YES	Make sure the home position sensor is connected properly and working. Replace it if necessary. If that's not the problem, replace the main board.
Test the power supply board for the proper output. To do this, disconnect CN8 on the main board. Pin 9 is the ground. Is the output 5 V at pin 8 and 35 V at pin 1?	NO	Replace the power supply board.
—	—	Check for problems with the printhead, printhead driver transistors, PF motor, and CR motor. (See **Test Points** on page 37.) If these components check out okay, replace the main board.

Table 3-4. Self-Test is Abnormal

Possible Problem	Y/N	Solution
Is printing too light or weak?	YES	Adjust the platen gap or replace the ribbon.
Do smudges appear on printed documents?	YES	Adjust the platen gap or replace the ribbon mask if broken.
Does the ribbon advance when the carriage moves?	NO	Replace the ribbon advance mechanism.
Are all connectors connected properly to the main board?	NO	Connect them properly.
Do characters appear jagged or misaligned when bi-directional printing is performed?	NO	Perform the Bi-D Adjustment as described in **Bidirectional Adjustment** on page 60.
Are any dots missings from individual characters?	YES	Test the printhead and printhead driver as described in **Test Points** on page 37. If problems are found, replace the printhead or main board as needed. It's also possible that the printhead ribbon cable may have worn out. Inspect it for damage and replace it if necessary.
—	—	Replace the printer mechanism.

Table 3-5. Paper Feeds Improperly

Possible Problem	Y/N	Solution
Does the paper feed motor turn?	NO	Test the PF motor as described in **Test Points** on page 37. If it's okay, the driver may be defective; replace the main board.
When the power is off, can you feed paper by rotating the platen knob manually?	NO	Replace the printer mechanism or paper loading mechanism parts.
Switch the tractor release lever. Do the tractor and paper feed rollers engage and disengage properly?	NO	Replace the printer mechanism.
Does the paper travel the correct distance when loading or feeding?	NO	Check the page length default setting. If incorrect, reset it. Check the RPE and BPE sensors. Are they defective or improperly connected? Replace or reconnect the sensors as needed. Is the sensor for the release lever defective or improperly connected? Replace or reconnect it as needed.

Table 3-6. Control Panel Does Not Operate

Possible Problem	Y/N	Solution
Is the control panel harness connected properly?	NO	Connect it properly.
—	—	Replace the control panel.

Table 3-7. Self-Test is Okay, But Online Printing is Abnormal

Check Point	Y/N	Solution
Are the default settings correct?	NO	Reset any incorrect settings or use the EEPROM clear to reset all setting to the factory default.
Is the interface connected properly?	NO	Connect it properly, or replace it if you suspect it of being damaged.
Is the firmware the latest version?	NO	Replace the firmware.
—	—	Reinstall the printer software.
—	—	Replace the main board.

3.4 Test Points

If you need to check the printhead, the printhead driver, or one of the motors or sensors, follow the instructions in this section.

WARNING **Make sure the printer is unplugged before testing.**

3.4.1 Printhead Check

Follow these steps to check the printhead coils:

1. Set the multimeter to measure resistance.

2. Connect one of the probes to one of the points C, as shown below.

3. Connect the other probe to each of the other points, 1 through 9.

   The meter should read $33.3 \pm 3.3\Omega$ at 25 °C (77 °F). If it's too low, the coil may be shorted out; if it's too high, the coil may have opened.

6 8 4 9 2 C C C 3 5 1 7

VIEW FROM POINT A
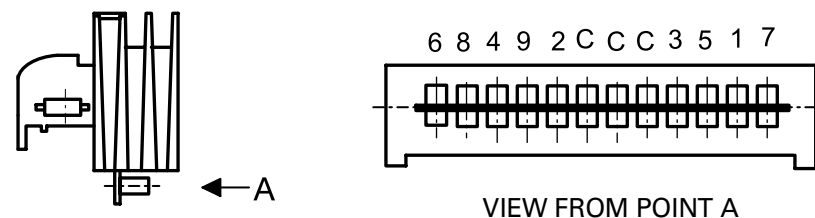
trb01

Figure3-1. Printhead Leads

If the printhead checks out okay, the problem may be with the driver. See **Printhead Driver Check** on page **38**.

3.4.2 Motor Check

Follow these steps to test the carriage and paper feed motors:

1. Set the multimeter to measure resistance.

2. Measure resistance across pins 1 and 3, and then across pins 2 and 4.

   The meter should show the values indicated below:

Table 3-8. Motor Coil Resistance

Motor	Specification
CR motor	5.7 Ω ±10% (at 25°C)
PF motor	16.0 Ω ±10% (at 25°C)

To test the CS motor on the optional color ribbon mechanism, follow these steps:

1. Set the multimeter to measure resistance.

2. Connect one of the probes to the brown wire.

3. Connect the other probe to each of the other four wires (blue, white, red, and orange).

   In each case, the resistance should measure 150 Ω ± 5% at 25 °C.

3.4.3 Sensor Check

All the sensors in this printer are mechanical contact switches. To test a sensor, follow these steps:

1. Set the multimeter to measure resistance.

2. To access the sensor, either remove it from the printer so you can touch the meter's probes directly to the sensor's leads, or unplug the sensor's cable from the main board and touch the probes to the end of the cable.

3. Toggle the sensor and watch for the meter reading to alternate between zero and infinity. If this fails to occur, the sensor is defective and must be replaced.

3.4.4 Printhead Driver Check

The printhead driver transistors (Q3 through Q11: nine in all) can be tested as follows:

1. Set the multimeter to measure resistance in the 10,000-ohm range.

2. Touch one probe to the base of each transistor (marked B), and touch the other probe to its emitter (marked E).

   If the transistor is okay, the resistance should be neither zero nor infinity. (On a test sample, all the transistors read about 6000 ohms.)

DISASSEMBLY AND ASSEMBLY

4.1 Overview

Follow the instructions in this chapter to disassemble and assemble LX-300+. Unless otherwise noted, reassemble the printer by following the disassembly steps in reverse.

4.1.1 Precautions

WARNING

■ **Always unplug the printer before servicing.**
■ **Bear in mind that the printhead may be hot after printing.**

CAUTION

■ **Use the tools specified in this chapter.**
■ **Lubricate the printer as needed, using only the specified oil and grease. (See "Maintenance" on page 65.)**
■ **After replacing parts, be sure to perform any indicated adjustments.**

4.1.2 Tools

The table below lists the tools recommended for disassembly, assembly, and adjustment. All tools are commercially available.

Table 4-1. Recommended Tools

Tool	EPSON Part No.
Needle-nose pliers	B740400100
Wire cutter	B740500100
Tweezers	B741000100
Philips screwdriver No.2	B743800200
Hex wrench (7 mm)	B741700200
Thickness gauge set	B776702201

4.2 Disassembly

Follow the steps below to disassemble the printer.

4.2.1 Preparation

Before disassmbling the printer, remove the platen knob, cover assembly, tractor unit, and paper eject unit. Remove the color upgrade kit if it's installed.

4.2.2 Printhead Removal

CAUTION !	Make sure the printer is unplugged before removing the printhead.

1. Remove 1 screw (CPB, 3x14) securing the printhead to the carriage.

2. Lift the printhead a little. Unhook the ribbon cable from the carriage.

3. Remove the ribbon cable from the printhead.

ADJUSTMENT REQUIRED	After putting the printhead back in or replacing it, perform the platen gap adjustment on page 59.
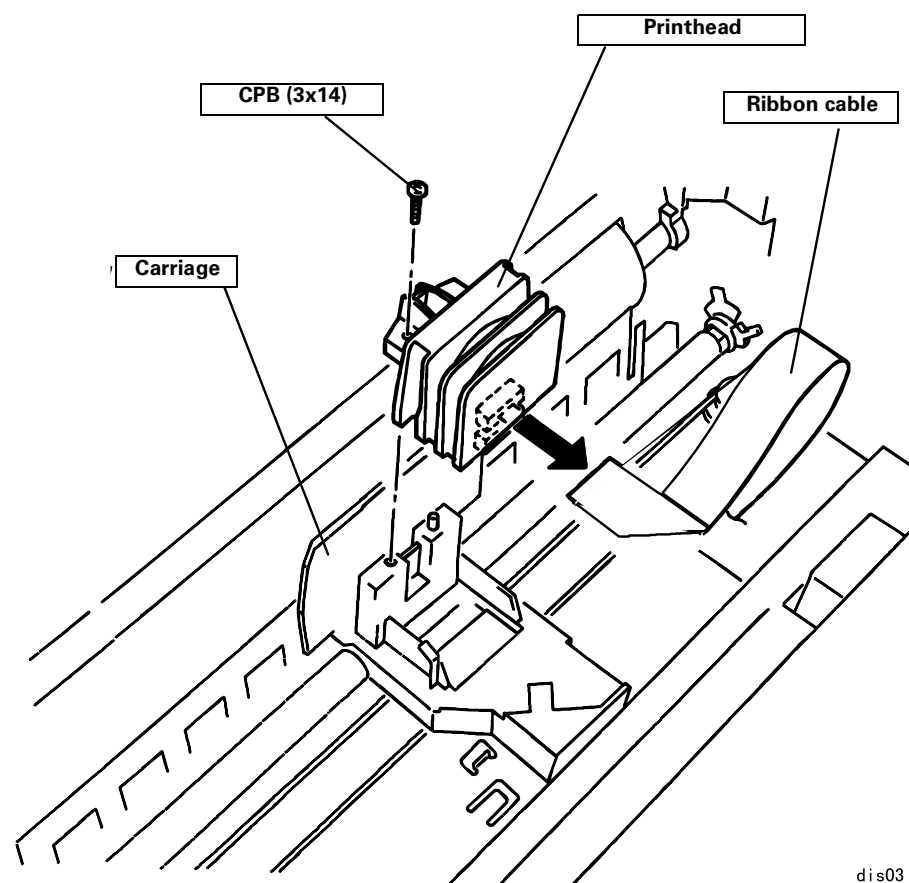
dis03

Figure 4-1. Printhead Removal

4.2.3 Upper Housing Removal

1. Set the tractor release lever forward (to tractor feed).

2. Remove 4 screws (CBP, 3x10) securing the upper housing to the lower housing.

3. Remove the upper housing.

REASSEMBLY

After reassembly, turn on the printer and make sure the LEDs are visible through the holes in the upper housing.

Figure 4-2. Upper Housing Removal
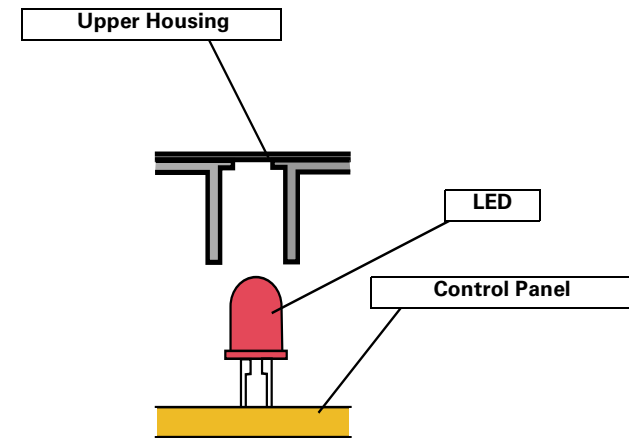
4.2.4 Printer Mechanism Removal

Preparation:

Remove the upper housing (see "Upper Housing Removal" on page 43)

1. Remove 5 screws securing the shield cover to the lower housing. Remove the shield cover.
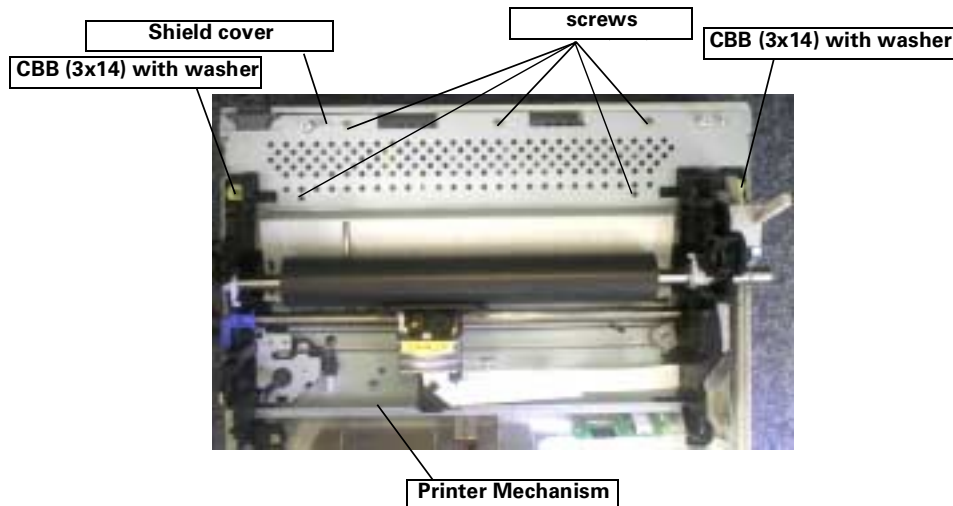
Figure 4-3. Upper Shield Plate

2. Remove 2 screws with washers (CBP, 3x14) securing the printer mechanism to the lower housing.

3. Tilt the printer mechanism back and remove the cables from the main board.
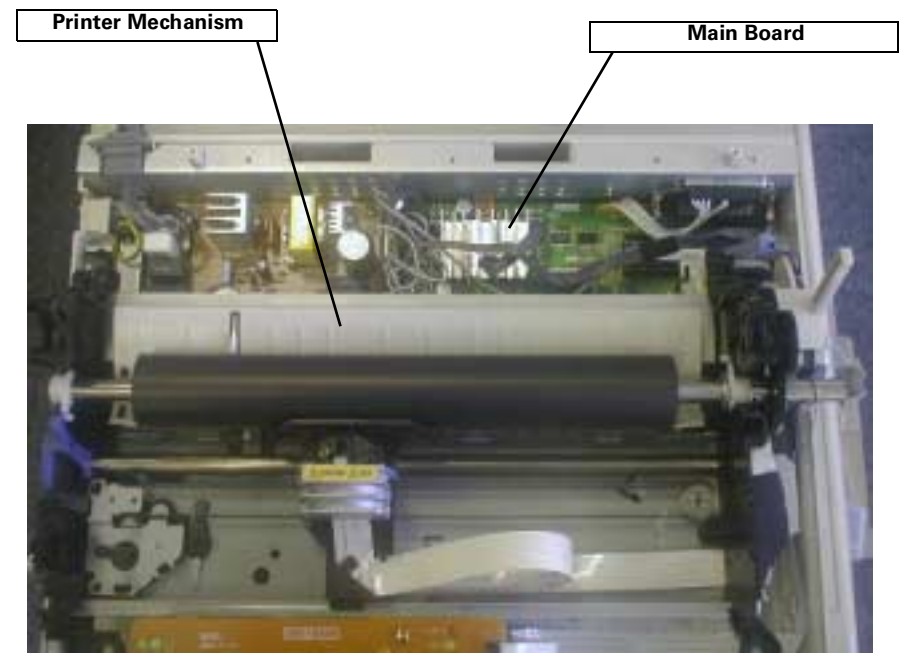
Figure 4-4. Cable Removal

4. Remove the printer mechanism.

> **ADJUSTMENT REQUIRED**
>
> **If you replace the printer mechanism, perform the Bi-D adjustment on page 60.**

4.2.5 Control Panel Board Removal

Preparation:

Remove the upper housing (see "Upper Housing Removal" on page 43)

1. Remove the ribbon cable from the connector on the control panel board.
2. Remove 3 screws (CBP, 3x10) securing the control panel board to the lower housing.
3. Remove the control panel board from the lower housing.

dis08
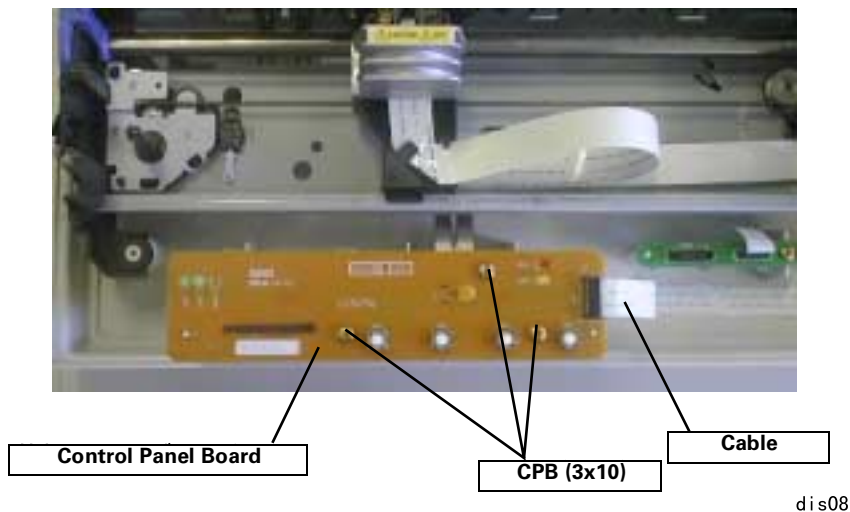
Figure 4-5. Control Panel Board Removal

4.2.6 C294MAIN Board Removal

Preparation:

❑ Remove the upper housing (see "Upper Housing Removal" on page 43)

❑ Remove the printer mechanism (see "Printer Mechanism Removal" on page 44)

1. Remove 2 hexagon nuts securing the serial interface connector to the lower shield plate, then remove the connector from the hole in the shield plate.
2. Remove 2 screws (CP, M3x6) securing the parallel interface to the lower shield plate.
3. Remove the ribbon cables from CN12 and CN13 (for the optional color upgrade kit and control panel).
4. Disconnect the power supply harness from CN8.
5. Remove 3 screws (CBP, 3x10) securing the main board to the lower housing, and remove the board.

ADJUSTMENT REQUIRED	**If you replace the main board, perform the destination setting and Bi-D adjustment on page 60.**

Lower Shield Plate   **CP (M3x6)**   **Hexagon Nut**

CBP (3x10)

CN13

CN12

CN8

Main Board   **CPB (3x10)**

dis09
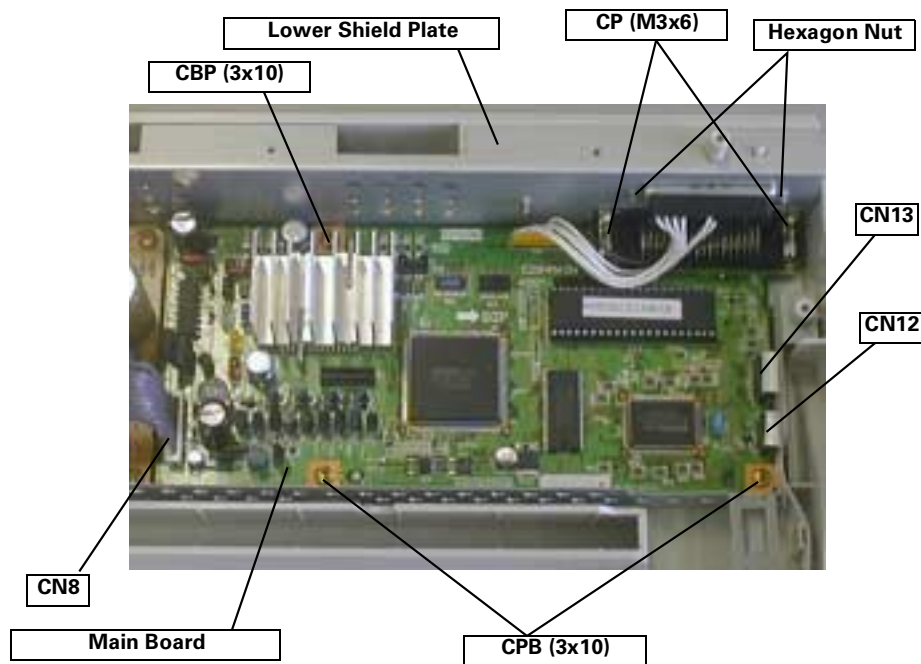
Figure 4-6. C294MAIN Board Removal

4.2.7 Power Supply Board Removal

Preparation:

❑ Remove the upper housing (see "Upper Housing Removal" on page 43)

❑ Remove the printer mechanism (see "Printer Mechanism Removal" on page 44)

1. Remove the power cable from CN1 on the power supply board.

2. Slide the power switch out of the lower housing.

3. Remove the harness connecting the power supply board to the main board (CN8 on the main board).

4. Remove 4 screws (CBP, 3x10) securing the power supply board to the lower housing.

5. Remove the power supply board.

Power Switch   **CBP (3x10)**   **CN1**   **CBP (3x10)**

CBP (3x10)   **Power Supply Board**   **CBP (3x10)**

dis10
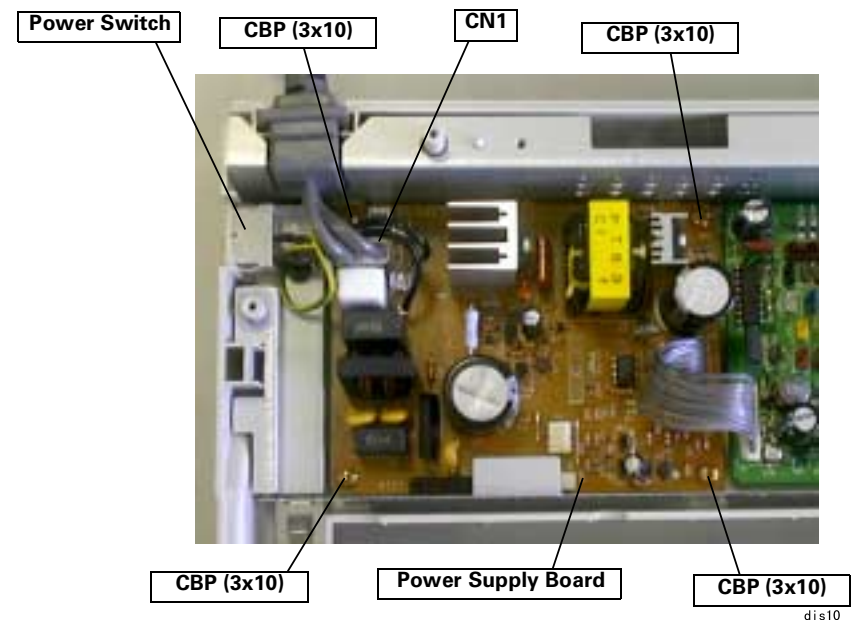
Figure 4-7. Power Supply Board Removal

4.2.8 Printer Mechanism Disassembly

Follow the steps below to disassemble the printer mechanism.

START

4.2.8.1 "Carriage (CR) Motor Removal"

4.2.8.3 "Carriage Removal"

4.2.8.4 "Ribbon Feed Mechanism

4.2.8.5 "BPE and RPE Sensor Removal"

4.2.8.6 "Home Position (HP) Sensor

4.2.8.5 "BPE and RPE Sensor Removal"

4.2.8.7 "Platen Gap (PG) Sensor Removal"

4.2.8.9 "Paper Feed (PF) Motor Removal"

4.2.8.2 "Platen Removal"

4.2.8.8 "Removing the Tractor Release Lever

4.2.8.11 "Paper Guide Removal"
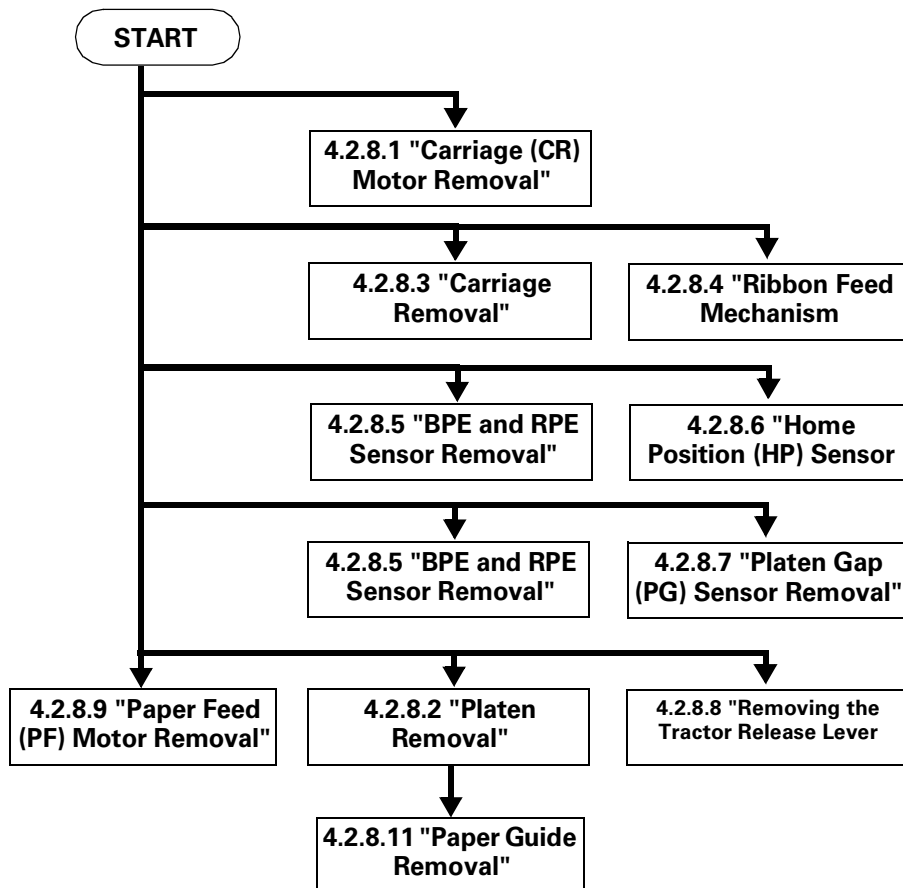
Figure 4-8. Printer Mechanism Disassembly

4.2.8.1 Carriage (CR) Motor Removal

Preparation:

Remove the printer mechanism (see "Printer Mechanism Removal" on page 44)

1. Remove the tension spring to release tension from the timing belt.

2. Remove the timing belt from the pulley of the CR motor.

3. Rotate the CR motor to remove it.

Timing Belt

Tension Spring, 8.10

CR Motor

Base Frame
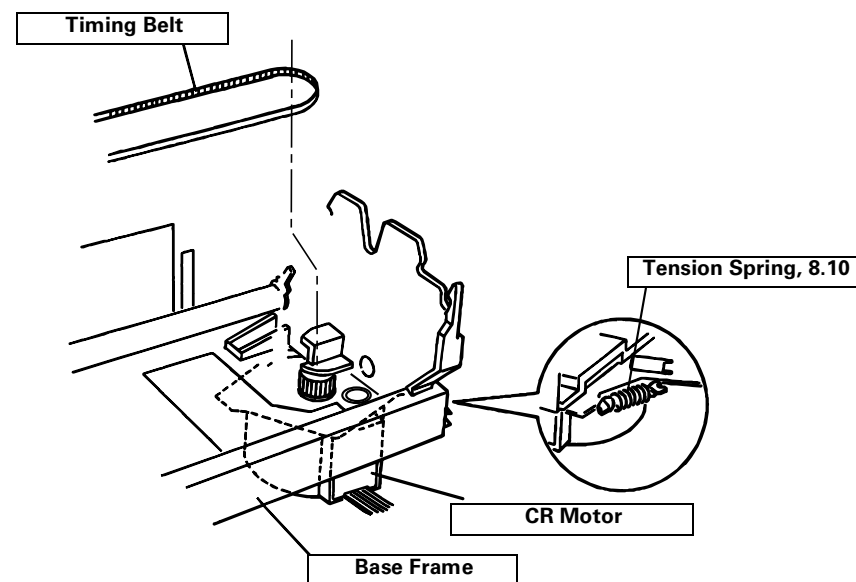
dis14

Figure 4-9. CR Motor Assembly Removal

ADJUSTMENT REQUIRED

If you replace the CR motor, perform the Bi-D adjustment on page 60.

4.2.8.2 Platen Removal

Preparation:

Remove the printer mechanism (see "Printer Mechanism Removal" on page 44)

1. Remove the grounding spring from the platen.

2. Push inward on the hook holding combination gear 17.5, 27 on its shaft and remove the gear.

To release the gear, push hook inward toward center of gear, and slide gear off shaft.

Combination gear, 17.5, 27

Gear, 34

dis20_a
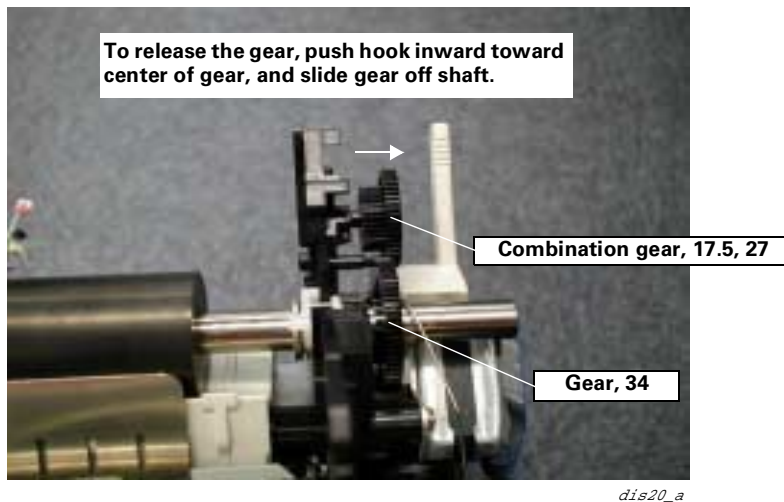
Figure 4-10. Removing Combination Gear 17.5, 27

3. Rotate the left and right bushings to free the platen, then lift the platen out of the printer mechanism.

Bushing, 11

Platen

Gear, 34

Left frame

Bushing, 11

Grounding spring

Combination gear, 17.5, 27

Right frame

dis21
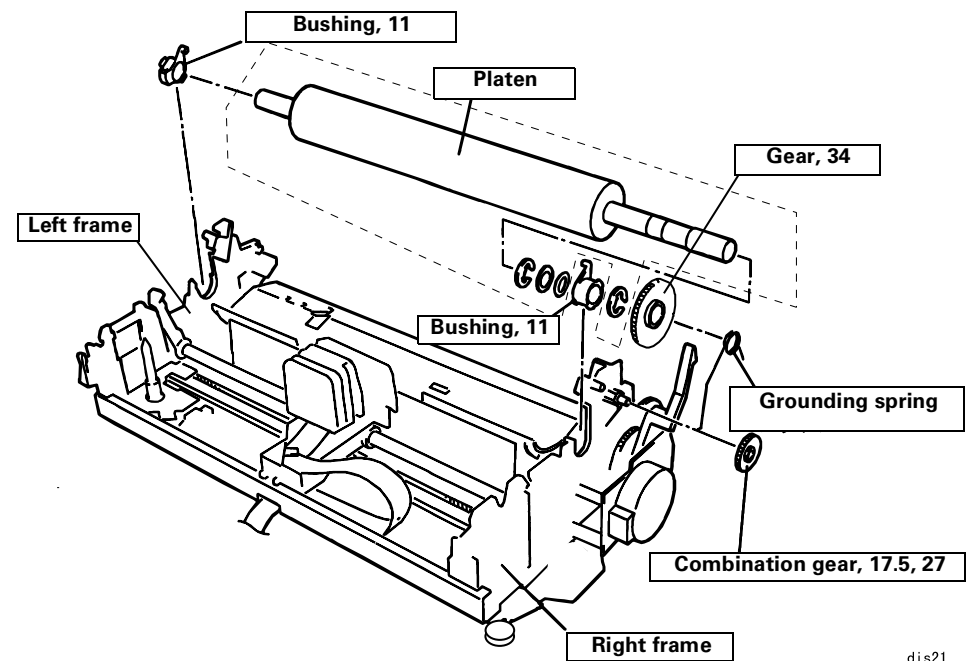
Figure 4-11. Platen Removal

4.2.8.3 Carriage Removal

Preparation:

❑ Remove the printer mechanism (see "Printer Mechanism Removal" on page 44)

❑ Remove the printhead (see "Printhead Removal" on page 42)

1. Remove the timing belt from its attachment on the carriage.

d i s15
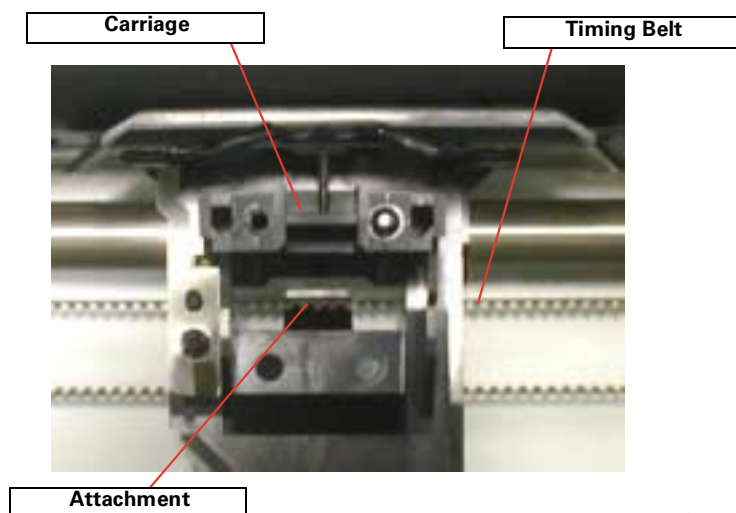
Figure 4-12. Timing Belt Removal

2. Remove the grounding plate on the left side of the printer, as shown in Figure 4-13.
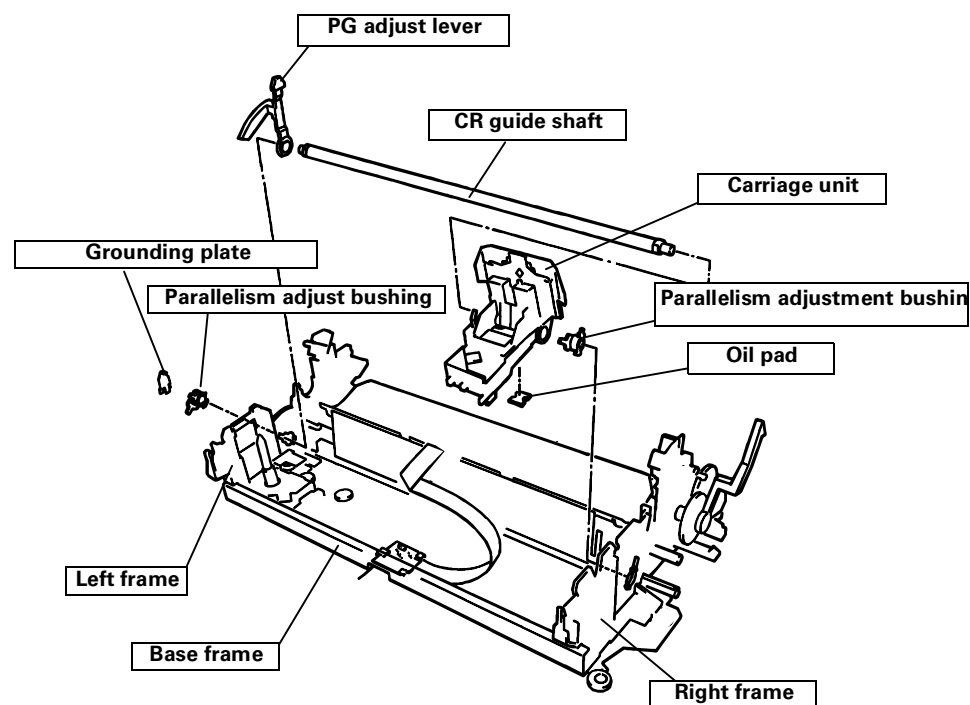
d i s16

Figure 4-13. Carriage Removal

3. Rotate the right and left parallelism adjustment bushings so that they align with the cutouts in the frame, then push them out through the frame.

4. Slide the carriage all the way to the right, then move the platen gap lever all the way to the rear, as shown below.

PG Lever

dis17

Figure 4-14. Platen Gap Lever

5. Remove the platen gap lever by carefully flexing it off the frame. Then remove the carriage along with the CR guide shaft from the printer mechanism.

ADJUSTMENT REQUIRED If you replace the carriage, perform the Bi-D adjustment on page 60.

REASSEMBLY Be sure to fit the carriage correctly onto the front guide rail (the front-most part of the metal frame). Part of the carriage goes over the rail, and part of it goes under.

4.2.8.4 Ribbon Feed Mechanism Disassembly

Preparation:

❑ Remove the printer mechanism (see "Printer Mechanism Removal" on page 44)

❑ Remove the tension spring from the motor bracket to release tension from the timing belt (see "Carriage (CR) Motor Removal" on page 47)

1. Release the 3 hooks securing the cover of the ribbon feed mechanism, and remove the cover.

RD cover   **RD ratchet**   **Planetary lever assy.**   **Timing belt**   **Driven pulley assy.**   **Combination gear, 51, 16.2**   **Gear, 13.2**   **Left frame**   **Combination gear, 51, 16.2**   **Base frame**
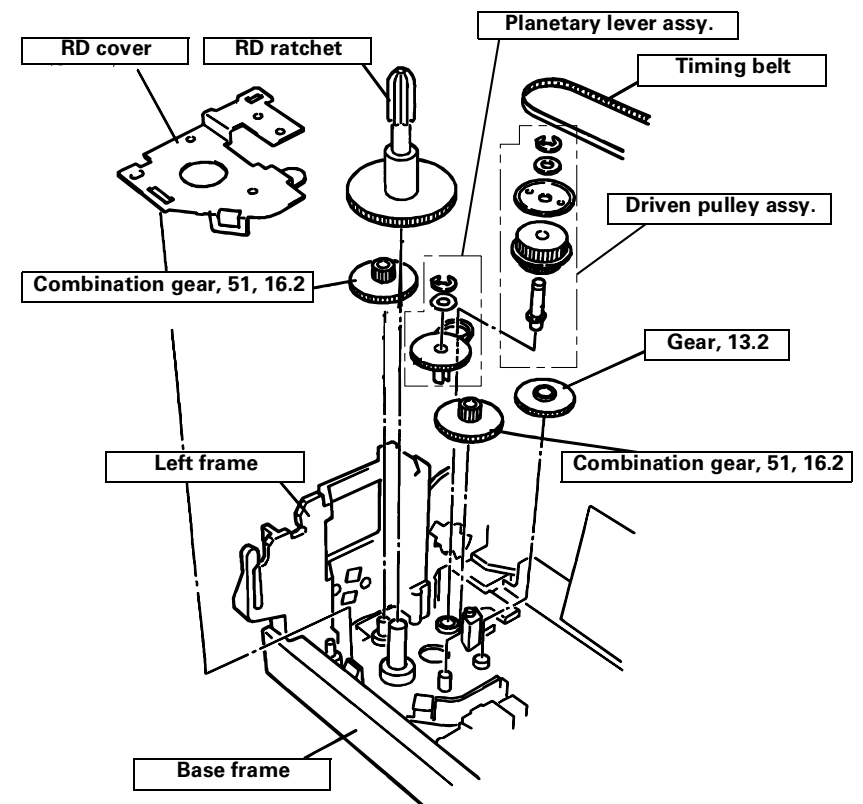
dis12

Figure 4-15. Ribbon Feed Mechanism Disassembly

4.2.8.5 BPE and RPE Sensor Removal

Preparation:

Remove the printer mechanism (see "Printer Mechanism Removal" on page 44)

1. Turn the printer mechanism over.

2. Loosen the wires to the BPE and RPE sensors. (Untape them as necessary and free them from the hook on the metal frame.)

3. Release the hook securing the BPE sensor to the frame (see figure below).
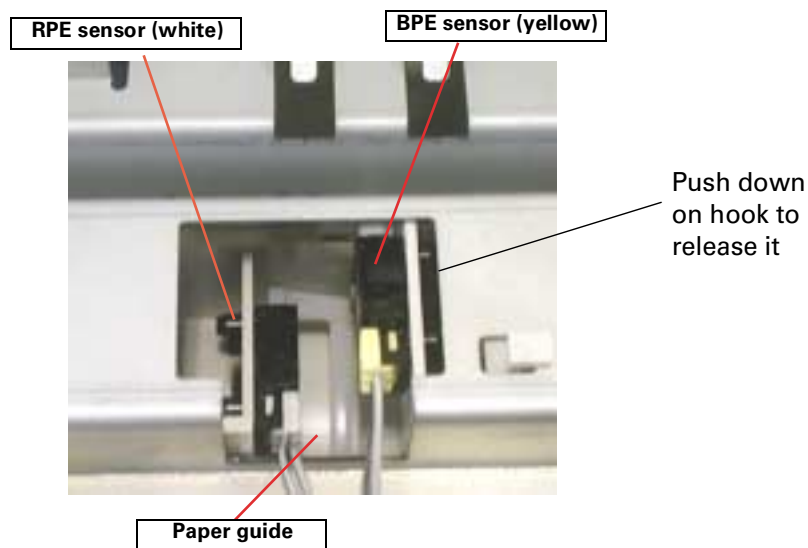
Figure 4-16. BPE/RPE Sensor Removal

4. Remove the BPE sensor. (Push in on the sensor's actuator so that it clears the frame when removing.)

5. Disconnect the cable from the BPE sensor (yellow).

6. To remove the RPE sensor, unhook it in the same manner, remove the sensor, and disconnect the cable from the sensor (white).

4.2.8.6 Home Position (HP) Sensor Removal

1. Release the 2 hooks of the HP sensor securing it to the base frame and remove the sensor.

2. Disconnect the harness from the sensor (black).
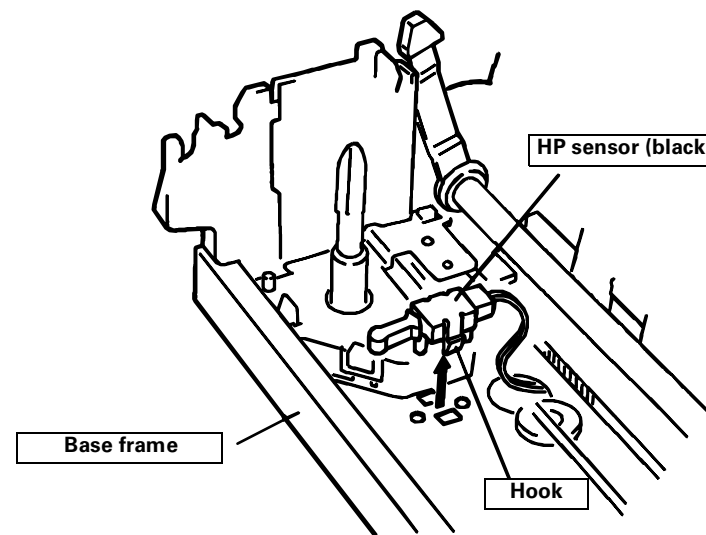
Figure 4-17. HP Sensor Removal

4.2.8.7 Platen Gap (PG) Sensor Removal

1. Release the 2 hooks of the PG sensor securing it to the left frame and remove the sensor.

2. Disconnect the harness from the sensor (white).
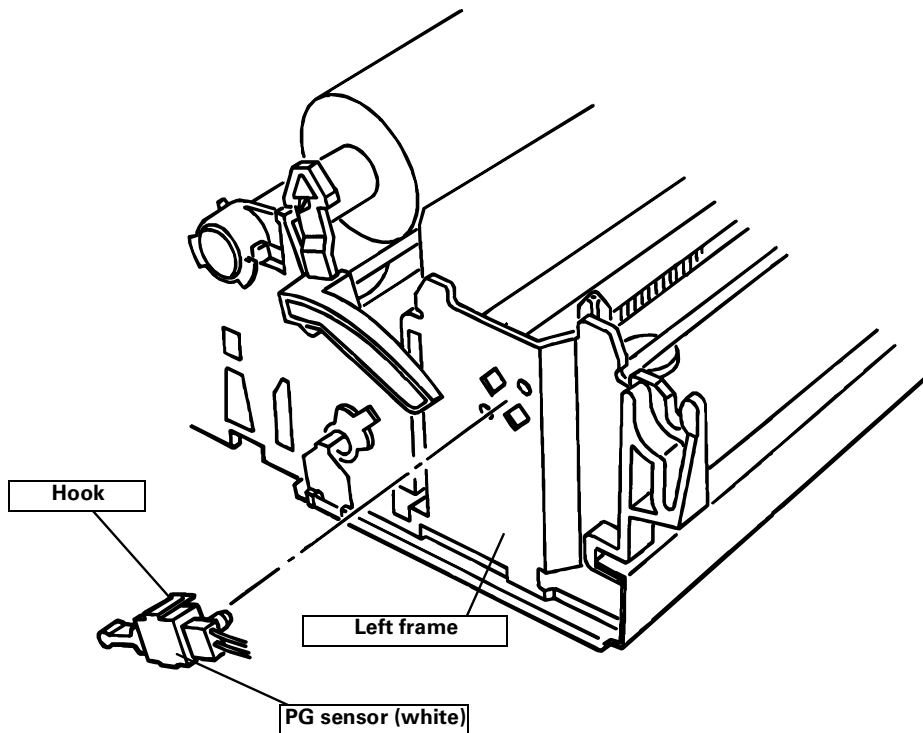
dis11

Figure 4-18. PG Sensor Removal

4.2.8.8 Removing the Tractor Release Lever Sensor

Preparation:

Remove the printer mechanism (see "Printer Mechanism Removal" on page 44)

1. Loosen the sensor's cables as necessary, then disconnect the harness (blue) from the sensor.

2. Release the 2 hooks securing the sensor to the right frame and remove the sensor.

Release lever position sensor (blue)

dis19

Figure 4-19. Release Lever Sensor Removal

4.2.8.9 Paper Feed (PF) Motor Removal

Preparation:

Remove the printer mechanism (see "Printer Mechanism Removal" on page 44)

1. Remove the platen grounding spring from the platen.

2. Remove 1 screw (CBP, 3x10) securing the PF motor to the right frame.

3. Release the clip on the right frame securing the PF motor and remove the motor.
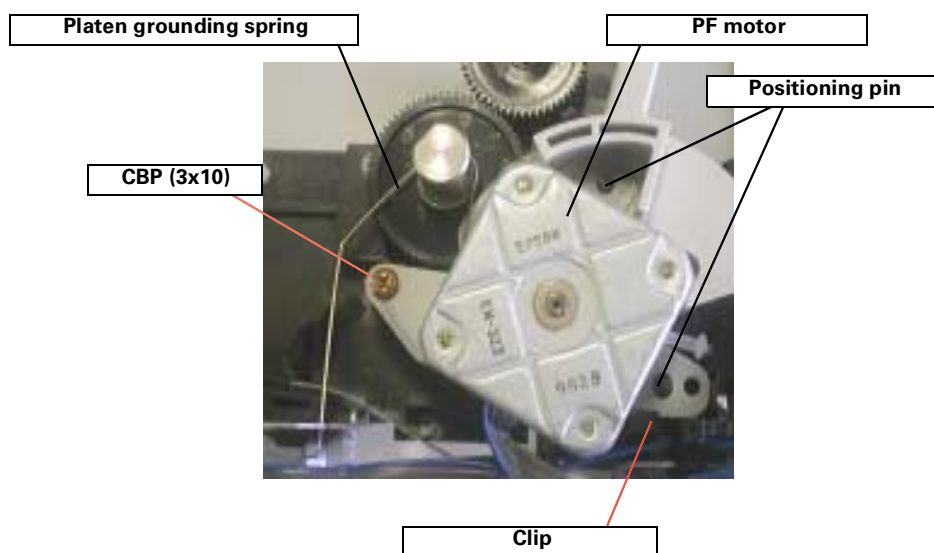
Figure 4-20. PF Motor Removal

REASSEMBLY When installing the PF motor, align it with the positioning pins shown above.

4.2.8.10 Removing the Tractor Drive Gears

Preparation:

❑ Remove the printer mechanism (see "Printer Mechanism Removal" on page 44)

❑ Remove the PF motor (see "Paper Feed (PF) Motor Removal" on page 53)

1. Move the tractor release lever to the forward position.

2. Remove the tractor release lever.
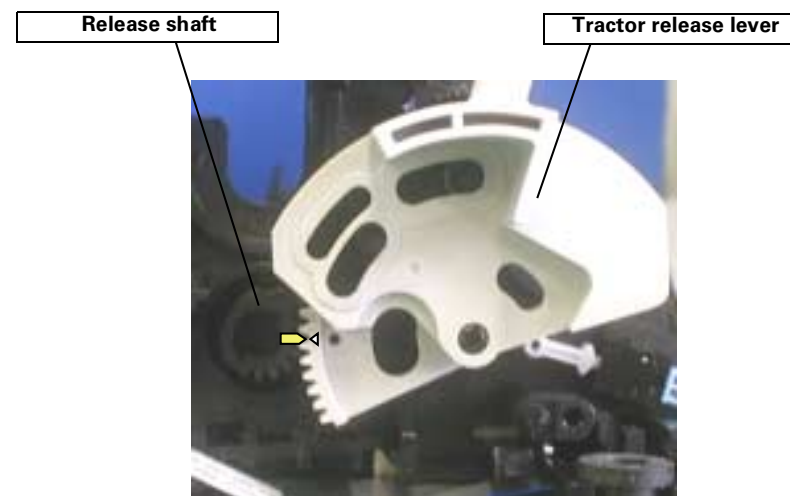
Figure 4-21. Tractor Release Lever Removal

REASSEMBLY When installing the release lever, be sure to align the mark on the lever with the mark on the release shaft, as shown above.

3. Release the hook securing gear 27.5 and remove the gear, washer, and compression spring.

4. Remove combination gear (8.5, 25.2).

| Hook securing gear |
| Combination gear, 8.5, 25.2 |

| Compression spring |
| Plain washer |

| Gear, 27.5 |

d i s23
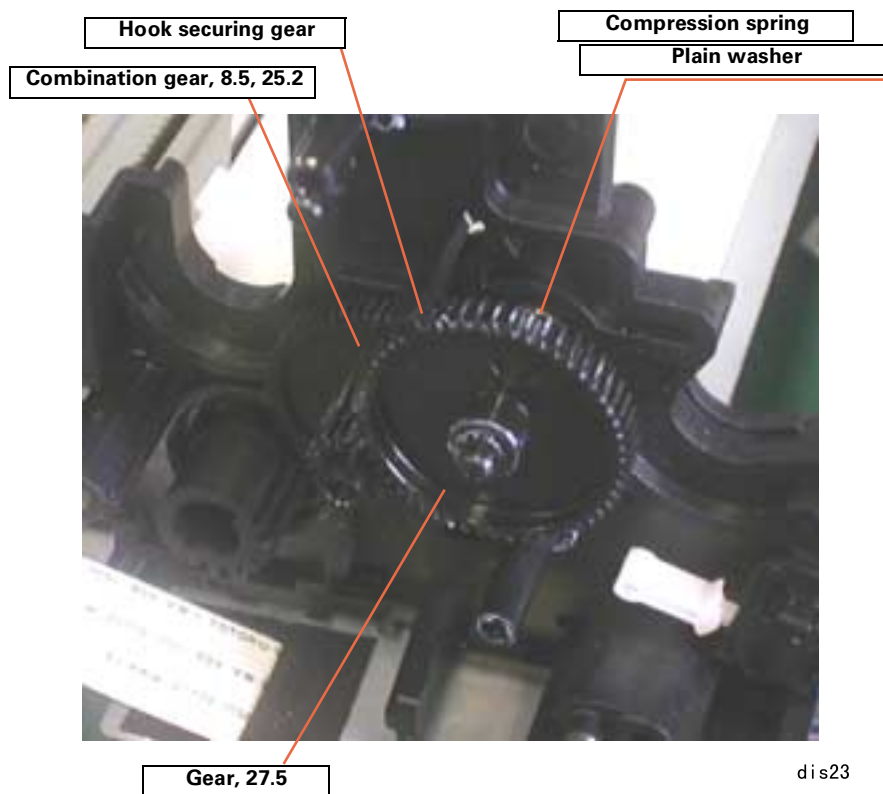
Figure 4-22. Gear Removal

4.2.8.11 Paper Guide Removal

Preparation:

❑ Remove the printer mechanism (see "Printer Mechanism Removal" on page 44)

❑ Remove the platen (see "Platen Removal" on page 48)

❑ Remove the carriage unit (see "Carriage Removal" on page 49)

❑ Remove the PF motor (see "Paper Feed (PF) Motor Removal" on page 53)

❑ Remove the tractor release lever (see "Removing the Tractor Drive Gears" on page 53)

1. Turn the printer mechanism over.

2. Remove any tape securing the RPE and BPE sensor cables to the metal frame, then free them from the hook on the frame.

3. Release the locking tab securing the paper guide to the metal frame by pushing it inward.
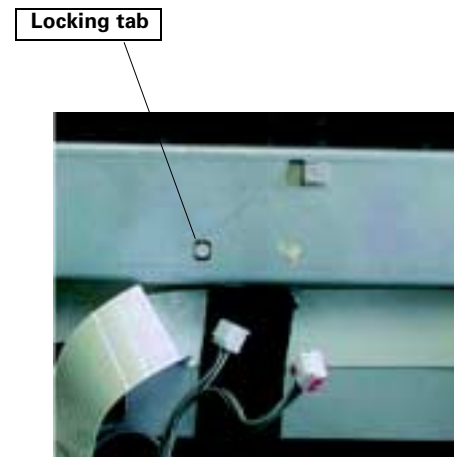
| Locking tab |

Figure 4-23. Releasing the Locking Tab

4. Slide the paper guide to the left to free the six hooks that hold it on the frame. (Two of the hooks are shown below.)
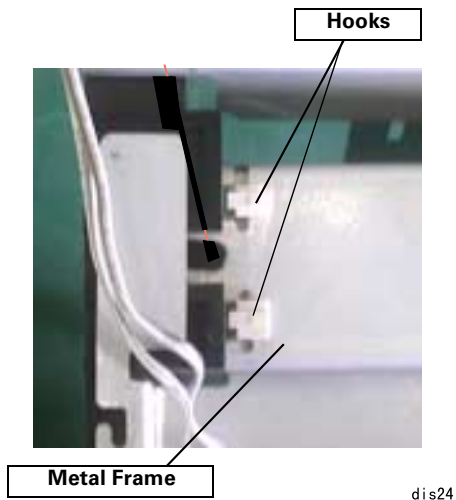
Figure 4-24. Paper Guide Removal

5. Turn the printer mechanism right side up. Remove the paper guide along with its release shaft by lifting it out of the frame.

ADJUSTMENTS

5.1 Platen Gap Adjustment

Perform the platen gap adjustment if you:

❑   replace the printhead

❑   replace the carriage

❑   remove the carriage guide shaft

❑   remove a parallelism adjust bushing

❑   notice that printing is too light

❑   notice the ink ribbon getting jammed too often

Follow these steps to perform the adjustment:

1.   Remove the upper housing. (See "Upper Housing Removal" on page 43.)

2.   Remove the printhead (see "Printhead Removal" on page 42) and then remove the ribbon mask. (Insert a narrow screwdriver down into each crease or fold in the ribbon mask to release it from the carriage; then lift the ribbon mask out of the carriage.)

3.   Reinstall the printhead.

4.   Slide the carriage all the way to the left.

5.   Insert a 0.45 mm thickness gauge (feeler gauge) between the printhead and the platen.

6.   Set the blue platen gap (PG) lever to the "0" position (toward the rear of the printer).

7.   Check that the printhead applies just enough pressure to keep the thickness gauge from falling down by its own weight. Refer to the following table:

Table 5-1. Adjustment Guidelines

Ideal Adjustment	Borderline Adjustment
0.455 ± 0.015 mm	At 0.44 mm, gauge falls down by its own weight.
	At 0.47 mm, gauge is held in place.

If the setting is incorrect, move the PG lever all the way forward, then adjust the left parallelism adjustment bushing. Set the PG lever to the "0" position again and retest the adjustment.

8.   Once the adjustment is correct on the left side of the printer, slide the carriage all the way to the right. Repeat the adjustment on the right side of the printer (follow steps 5 through 7, but make the adjustment on the *right* parallelism bushing).

9.   Slide the carriage to the middle of the printer and check the adjustment. If it's incorrect, you'll have to repeat the adjustment on both the left and right sides of the printer.

5.2 Bidirectional Adjustment

Perform the Bi-D adjustment if you:

❑ replace the main board

❑ replace the carriage motor

❑ replace the entire printer mechanism

Follow the steps below to perform the adjustment:

1. Connect the printer to a computer using a parallel cable.

2. Turn on the computer and printer.

3. Load continuous paper in the printer.

4. Start the adjustment program. (It's referred to as "Q80A10V"; this is the same adjustment program used by the EPSON LQ570e.)

    You see this screen:
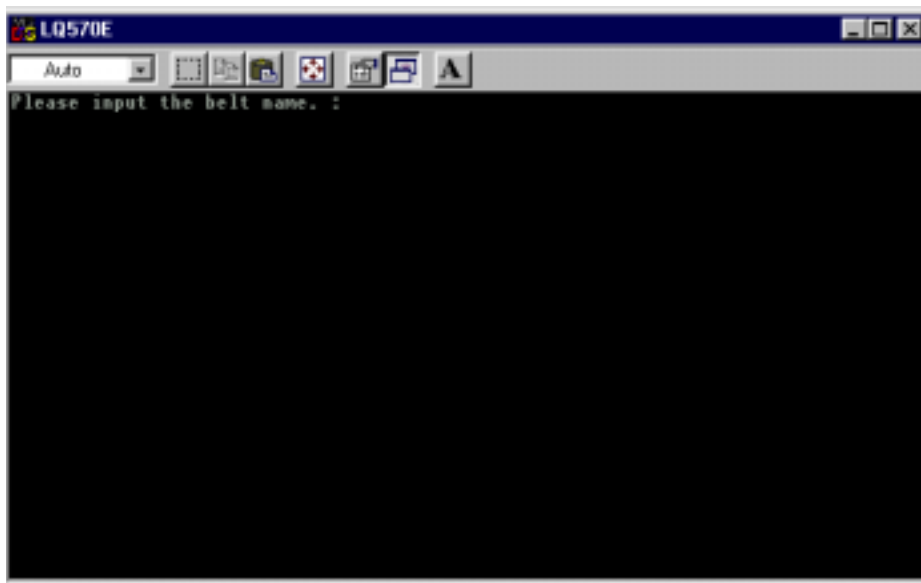
5. Press **Enter**.

You see this screen:
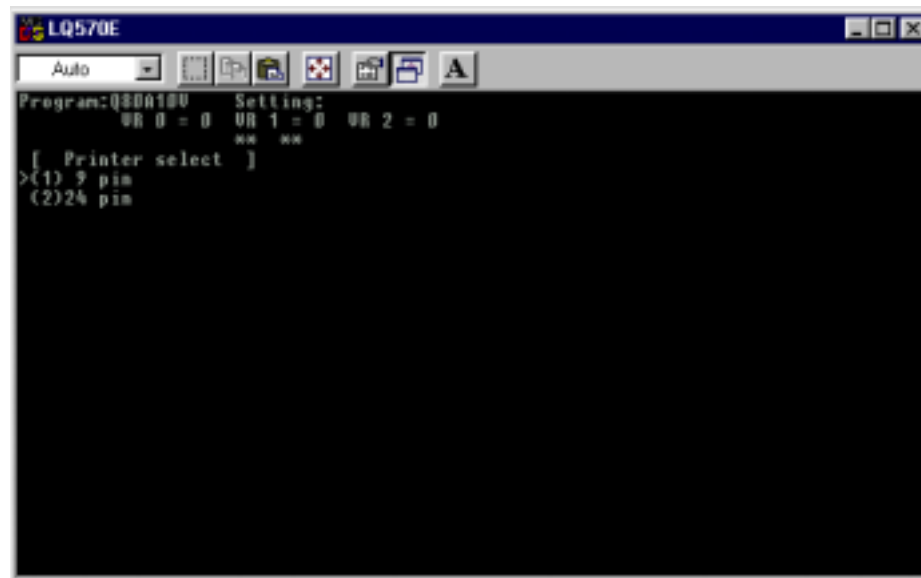
6. Using the arrow keys, make sure **9 pin** is selected, and press **Enter**.
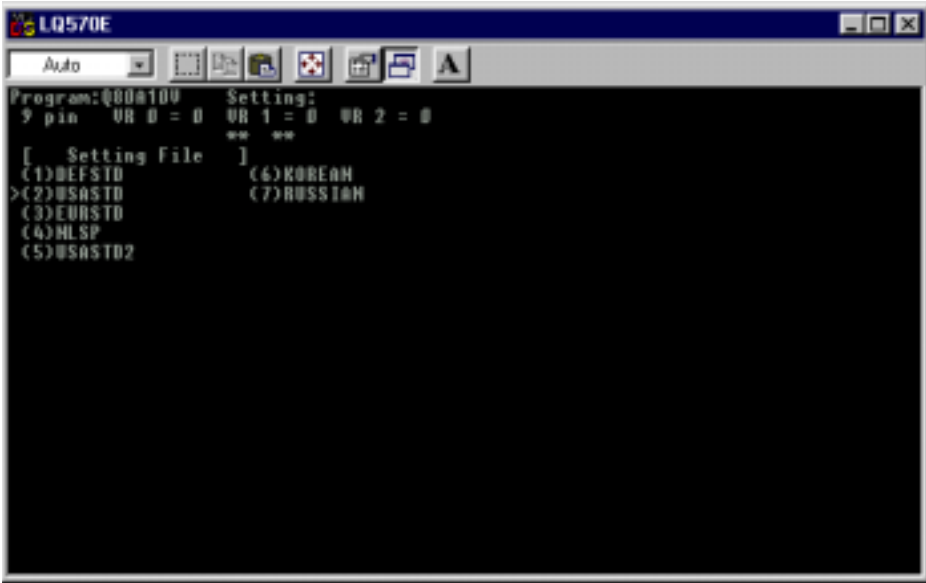
You see this screen:

The available destination settings are as follows:

Table 5-2. Destination Setting List

Destination	Setting	Destination	Setting
EAI, EAI (Latin)	USASTD	EDG(NLSP)	NLSP
EURO, EDG, EUL, EUL (SCANDINAVIA), EFS, EIS, EIB	EURSTD	EUL (MIDDLE EAST), EAL, ESP, EHK	DEFSTD

7.   Select **USASTD** and press **Enter**.

You see this screen:

8.   Select **Out Going** and press **Enter**.

You see this screen:
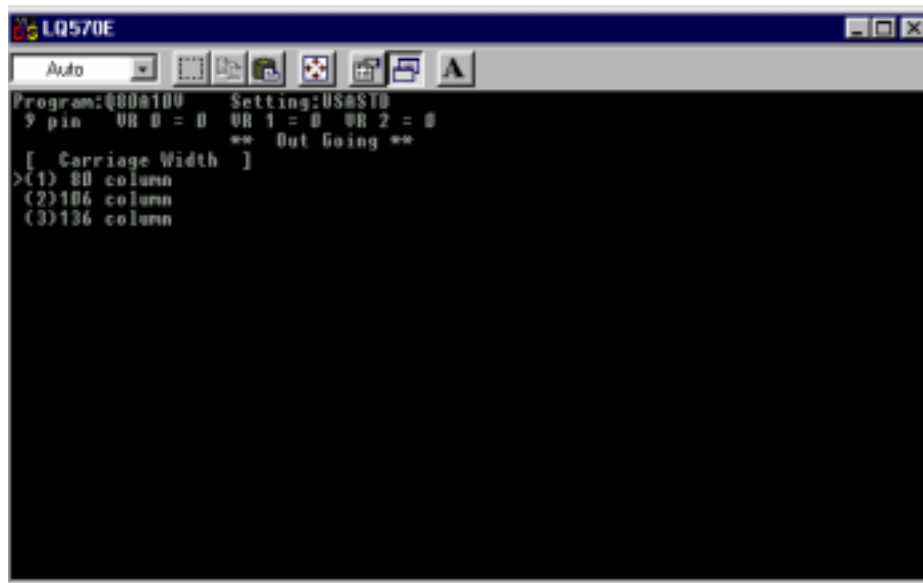
You see this screen:

9. Make sure **80 column** is selected, and press **Enter**.
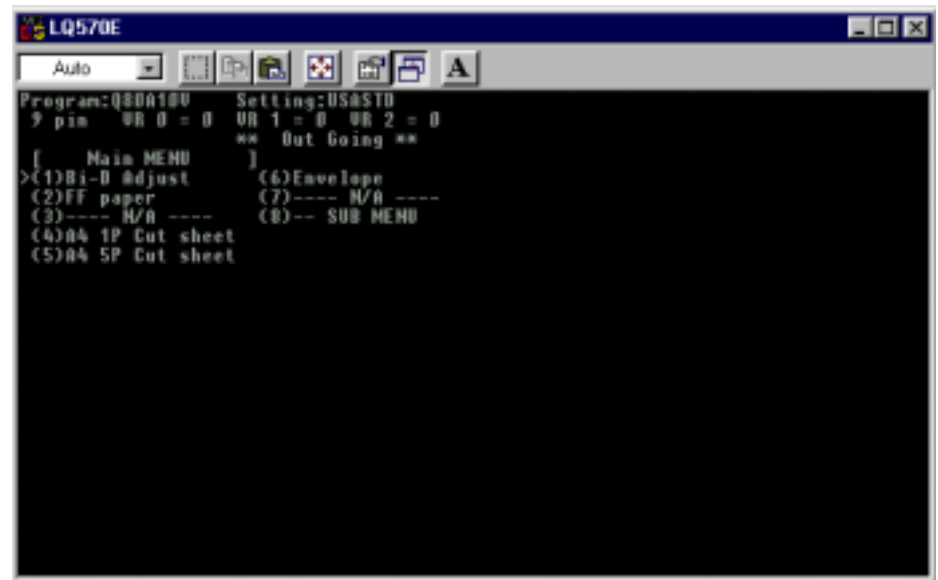
10. Make sure **Bi-D Adjust** is selected, and press **Enter**.

You see this screen:
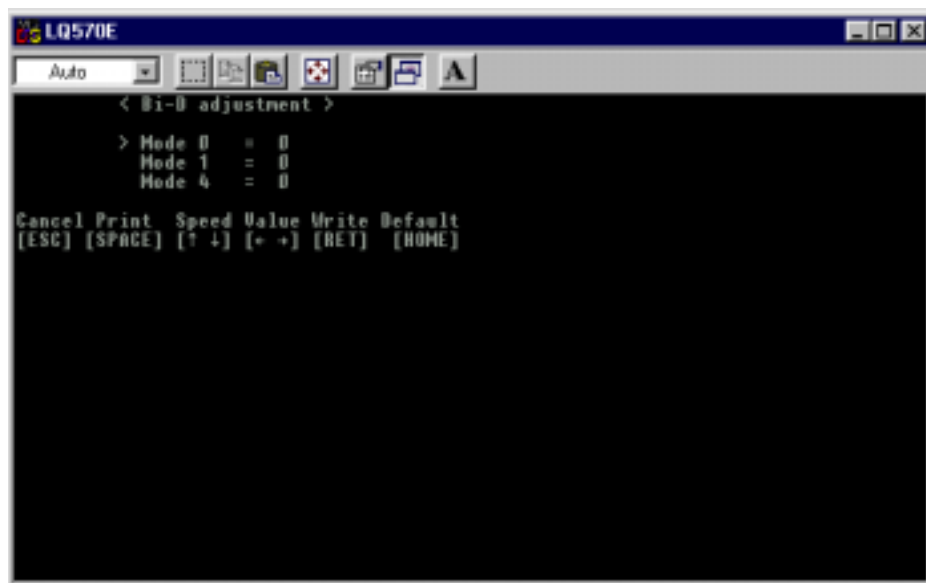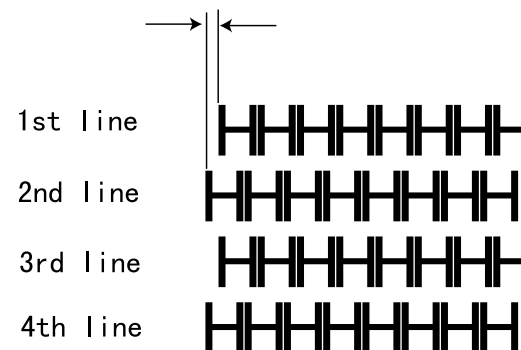
11. Press the **Space bar** to print the first adjustment pattern (in Mode 0). After a delay of several seconds, the printer prints a pattern similar to the following:

adj12

12. Make sure the characters in the 1st and 3rd lines are aligned with the characters in the 2nd and 4th lines:

If the characters are not aligned, use the **Left** and **Right** arrow keys to change the adjustment value and bring the characters into alignment. Press the **Space bar** to print another adjustment pattern and check the results.

13. After making sure the characters are aligned, use the **Up** and **Down** arrow keys to switch to Mode 1. Repeat the adjustment (following steps 11 and 12) in this mode, then switch to Mode 4 and repeat the adjustment again.

14. After performing the adjustment in all three modes, press **Escape** several times to exit the adjustment program.

15. Turn the printer off to store the adjustment values.

CAUTION
!

■ **Do not attempt to use the adjustment program to perform any operations except those described above.**

■ **Using the control panel to clear the EEPROM does not change the Bi-D setting.**

MAINTENANCE

6.1 Overview

After disassembling the printer, follow the steps below to clean and lubricate it as needed.

> **WARNING**
> - **Unplug the AC cable before performing maintenance.**
> - **Avoid touching the printhead after printing; it may be hot.**

6.1.1 Cleaning

Use a neutral detergent or diluted alcohol to clean the outside of the case. Vacuum dust or small pieces of paper from the inside of the printer.

> **CAUTION**
> **!**
> Never use thinner, tricren, or ketone solvent, as it may damage plastic or rubber parts.

6.1.2 Lubrication

Use only the following types of oil and grease to lubricate the printer:

Table 6-1. Lubricants

Type	Name	Quantity	EPSON Part No.
Grease	G-26	40 g	B702600001
Oil	O-2	40 cc	B710200001

> **CAUTION**
> **!**
> EPSON has determined the best types of lubricants for this printer based on extensive testing. Use only the lubricants listed above. Incorrect lubricants can damage the printer or hinder performance.

Lubricate the printer by referring to the figures below and on the following pages:

Apply G-26 to the 3 short shafts and 1 boss of the ribbon drive mechanism.
G-26, 1/2 grain of rice

Apply G-26 to the long shaft of the RD ratchet.
G-26, 1 grain of rice
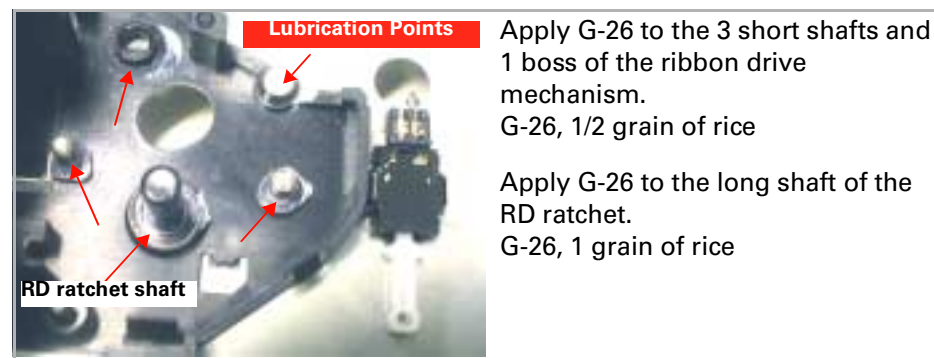
Figure 6-1. Ribbon Drive Mechanism (1 of 2)

Apply G-26 to the gear teeth as shown.
G-26, 1/2 grain of rice
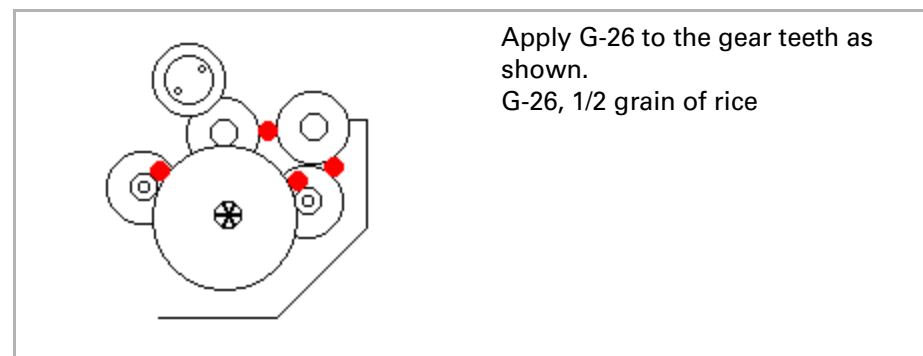
Figure 6-2. Ribbon Drive Mechanism (2 of 2)

Apply G-26 to 3 shafts on the right frame.

G-26, 1 grain of rice
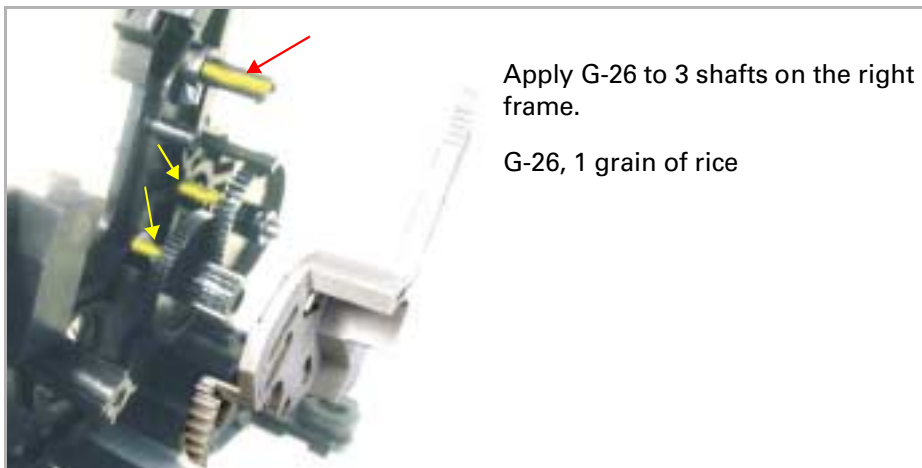
Figure 6-3. Shafts on the Right Frame

Apply G-26 to the end-points on each paper feed roller shaft. Avoid getting grease on the rollers themselves.

G-26, 1/2 grain of rice

Figure 6-5. Paper Feed Rollers

Lubricate G-26 at 2 places as shown on the release lever. Make sure some of the grease lubricates the inside of the release lever where the sloped surface contacts the gear.

G-26, 1 grain of rice

Figure 6-4. Tractor Release Lever

Turn the paper guide assembly upside down and lubricate the release shaft where it contacts the frame (4 places).
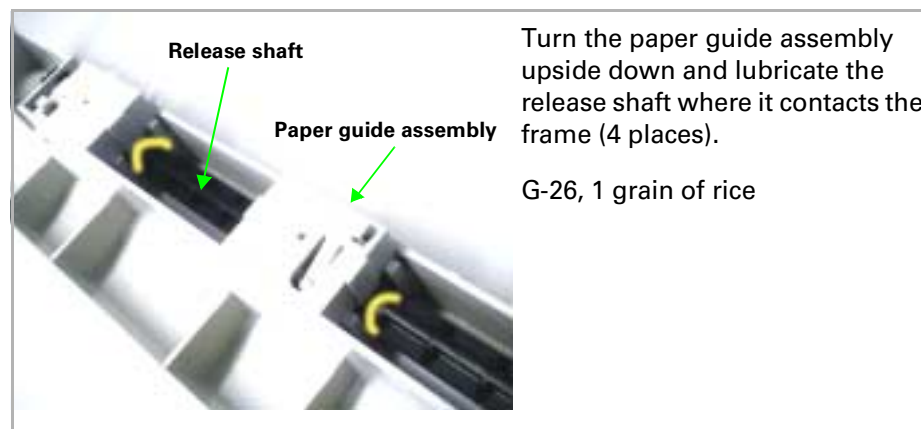
G-26, 1 grain of rice

Figure 6-6. Paper Release Shaft

Apply G-26 to the left and right bushings in which the tractor shaft rotates.
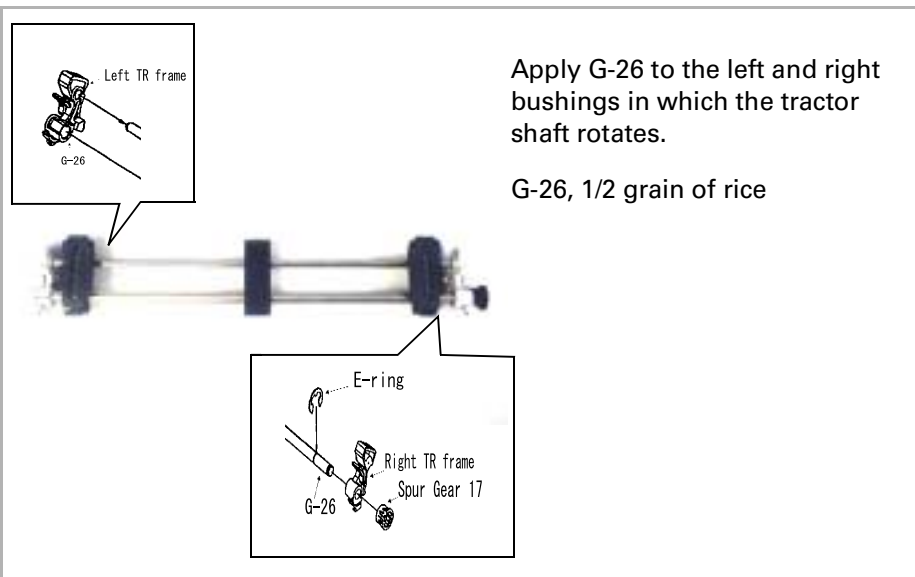
G-26, 1/2 grain of rice

Figure 6-7. Tractor Assembly

If you replace the oil pad (located under the printhead carriage as shown), add oil to it as follows:

1. Fill a syringe to 0.30 ml of O-2.
2. Apply the oil to the pad.

Note: Be careful not to over- or under-lubricate the pad. The correct amount is 0.28-0.32 cc.

Figure 6-8. Oil Pad

Slide the carriage to the middle of the printer, then apply G-26 along the entire front guide rail, both on top and underneath where the carriage touches it.

G-26, 40 mm x 2 places

Guide rail

Figure 6-9. Front Guide Rail

Apply G-26 to the two places where the carriage motor hooks onto the base frame, as shown.

G-26, 1/2 grain of rice x 2
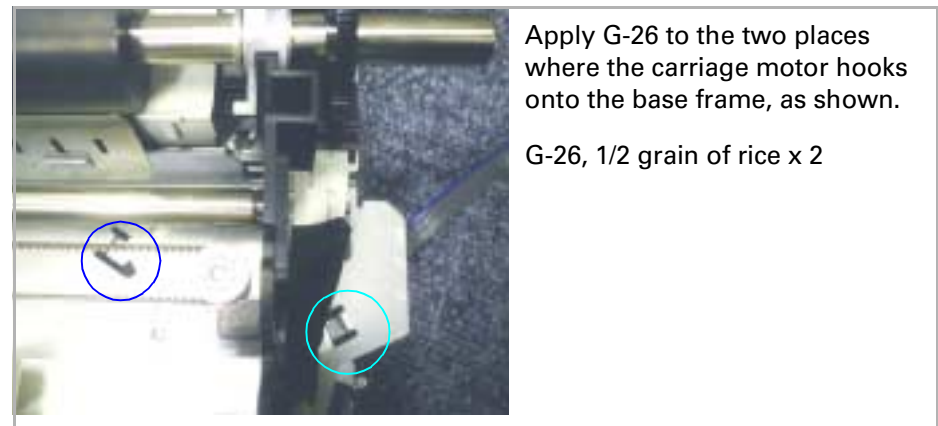
Figure 6-10. Carriage Motor

Apply G-26 to the gear shaft shown at left.

G-26, 1/2 grain of rice

Figure 6-11. Combination Gear 17.5, 27

Apply G-26 to the point where the grounding spring attaches to the platen shaft:

G-26, 1 grain of rice.

Apply G-26 to the middle of the platen drive gear as shown:

G-26, 10mm

Figure 6-12. Platen Grounding Spring and Drive Gear

APPENDIX

7.1 Electrical Connections

The figure below illustrates how the primary components are connected.
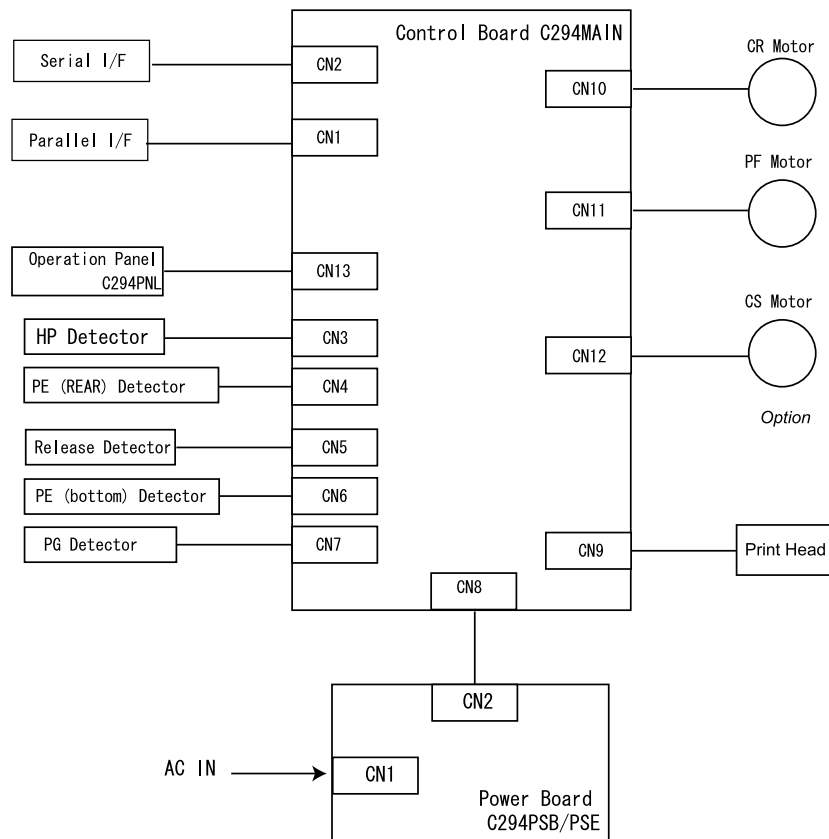
Figure 7-1. Cable Connections

7.1.1 Connector Summary

The following table summarizes connections to the main board:

Table 7-1. C294MAIN Board Connector Summary

Connector	Function	Pins
CN1	Parallel I/F	36
CN2	Serial I/F	6
CN3	HP Sensor	2
CN4	PE (Rear) Sensor	2
CN5	Tractor Release Sensor	2
CN6	PE (Bottom) Sensor	2
CN7	Platen Gap Sensor	2
CN8	Power Supply Board C294PSB/PSE	9
CN9	Printhead	12
CN10	CR Motor	4
CN11	PF Motor	4
CN12	CS (Color Shift) Motor (for optional color ribbon kit)	10
CN13	Control Panel C294PNL	12

7.1.2 Connector Pin Assignments

The following tables define the functions of each connector's pins:

Table 7-2. HP Sensor- CN3

Pin	I/O	Signal Name	Function
1	I	HP	Home position signal
2	-	GND	Signal ground

Table 7-3. PE (Rear) Sensor- CN4

Pin	I/O	Signal Name	Function
1	I	RPE	Rear paper end signal
2	-	GND	Signal ground

Table 7-4. Tractor Release Sensor - CN5

Pin	I/O	Signal Name	Function
1	I	RELEASE	Release sensor signal
2	-	GND	Signal ground

Table 7-5. PE (Bottom) Sensor - CN6

Pin	I/O	Signal Name	Function
1	I	BPE	Bottom paper end signal
2	-	GND	Signal ground

Table 7-6. Platen Gap Sensor - CN7

Pin	I/O	Signal Name	Function
1	I	PG	Platen gap (copy mode) sensor signal
2	-	GND	Signal ground

Table 7-7. Power Supply Board - CN8

Pin	I/O	Signal Name	Function
1	-	VH	+35VDC
2	-	VH	+35VDC
3	-	GP	Signal ground
4	-	GP	Signal ground
5	O	PSC	Power save control
6	O	POFF	Power off signal
7	-	+5V	+5VDC
8	-	+5V	+5VDC

Table 7-8. Printhead - CN9

Pin	I/O	Signal Name	Function
1	O	HD7	Head data 7
2	O	HD8	Head data 8
3	O	HD9	Head data 9
4	O	HD3	Head data 3
5	-	HDCOM	Common (VP)
6	-	HDCOM	Common (VP)
7	-	HDCOM	Common (VP)
8	O	HD2	Head data 2
9	O	HD9	Head data 9
10	O	HD4	Head data 4
11	O	HD8	Head data 8
12	O	HD6	Head data 6

Table 7-9. Carriage Motor - CN10

Pin	I/O	Signal Name	Function
1	O	CRA	Carriage motor phase A
2	O	CR$\overline{A}$	Carriage motor phase $\overline{A}$
3	O	CRB	Carriage motor phase B
4	O	CR$\overline{B}$	Carriage motor phase $\overline{B}$

Table 7-10. Paper Feed Motor - CN11

Pin	I/O	Signal Name	Function
1	O	PFA	Paper feed motor phase A
2	O	PF$\overline{A}$	Paper feed motor phase $\overline{A}$
3	O	PFB	Paper feed motor phase B
4	O	PF$\overline{B}$	Paper feed motor phase $\overline{B}$

Table 7-11. Color Shift Motor - CN12

Pin	I/O	Signal Name	Function
1	-	VH	+35VDC
2	-	CS/HOLD	+5VDC
3	-	+5V	+5VDC
4	O	CS$\overline{A}$	CS motor phase $\overline{A}$
5	O	CS$\overline{XA}$	CS motor phase $\overline{XA}$
6	O	CS$\overline{B}$	CS motor phase $\overline{B}$
7	O	CS$\overline{XB}$	CS motor phase $\overline{XB}$
8	-	GP	Signal ground
9	I	CSSW	Color ribbon sensor signal
10	-	GND	Signal ground

Table 7-12. Control Panel - CN13

Pin	I/O	Signal Name	Function
1	-	+5V	+5VDC
2	O	LED5	LED5
3	O	LED4	LED4
4	O	LED3	LED3
5	O	LED2	LED2
6	O	LED1	LED1
7	I	SW1	Switch 1
8	-	GND	Signal ground
9	-	GND	Signal ground
10	I	SW2	Switch 2
11	I	SW3	Switch 3

7.2 Printing Specifications

7.2.1 Printing Specification

❑ Print method: Impact dot matrix

❑ Number of pins: 9 pins

❑ Print pin arrangement: 9x1

❑ Print pin diameter: 0.29 mm (0.0114 inch)

❑ Color (Option):   Black, Magenta, Cyan, Yellow

❑ Print direction: Bi-directional with logic seeking

❑ Print speed and printable columns:

Table 7-13. Print Speed and Printable Columns

Printing mode	Character pitch (cpi)	Printable columns	Printing speed (cps)
High speed draft	10	80	300
	12	96	337
	15	120	337
High speed draft condensed	17	137	321
	20	160	300
Draft	10	80	225
	12	96	270
	15	120	225
Draft condensed	17	137	191
	20	160	225
Draft emphasized	10	80	112

Table 7-13. Print Speed and Printable Columns (continued)

Printing mode	Character pitch (cpi)	Printable columns	Printing speed (cps)
NLQ	10	80	56
	12	96	67
	15	120	56
	17	137	47
	20	160	56

NOTE: *If the power supply voltage drops to the lower limit, the printer stops printing, and then resumes printing but more slowly than before.*

❑ Resolution:

Table 7-14. Resolution

Printing mode	Horizontal density (dpi)	Vertical density (dpi)	Adjacent dot print
High speed draft	90	72	No
Draft	120	72	No
Draft condensed	240	72	No
Draft emphasized	120	72	Yes
NLQ	240	144	No
Bit image	60, 72, 80, 90 or 120	72	Yes
	120 or 240	72	No

❑ Control code: ESC/P and IBM 2380 Plus emulation (Refer to "Control Codes" on page 90)

❑ Character tables:

■ Standard version (13 character table)

Italic table	PC437 (US, Standard Europe)
PC850 (Multilingual)	PC860 (Portuguese)
PC863 (Canadian-French)	PC865 (Nordic)
PC861 (Icelandic)	BRASCII
Abicomp	Roman 8
ISO Latin 1	PC858
ISO 8859-15	

■ NLSP version (38 character tables)

Italic table	PC437 (US, Standard Europe)
PC850 (Multilingual)	PC437 Greek
PC853 (Turkish)	PC855 (Cyrillic)
PC852 (East Europe)	PC857 (Turkish)
PC866 (Russian)	
PC869 (Greek)	MAZOWIA (Poland)
Code MJK (CSFR)	ISO 8859-7 (Latin / Greek)
ISO Latin 1T (Turkish)	Bulgaria (Bulgarian)
PC 774 (LST 1283:1993)	Estonia (Estonia)
ISO 8859-2	PC 866 LAT. (Latvian)
PC 866 UKR (Ukrania)	PC860 (Portuguese)
PC 861 (Icelandic)	PC865 (Nordic)
PC APTEC (Arabic)	PC708 (Arabic)
PC 720 (Arabic)	PCAR864 (Arabic)
PC863 (Canadian-French)	Abicomp
BRASCII	Roman 8
ISO Latin 1	Hebrew 7*
Hebrew 8*	PC862 (Hebrew)*
PC858	IAO8859-15
PC771 (Lithuania)	

* Not displayed in default setting mode.

❑ International character sets: 13 countries

U.S.A	France	Germany
U.K.	Denmark 1	Sweden
Italy	Spain 1	Japan
Norway	Denmark 2	Spain 2
Latin America		

> **NOTE:** *The international and legal characters are the following 12 codes:*
> *23H, 24H, 40H, 5BH, 5CH, 5DH, 5EH, 60H, 7BH, 7CH, 7DH, 7EH*

❑ Typeface (bit map fonts)

EPSON Draft	10cpi, 12cpi, 15cpi
EPSON Roman	10cpi, 12cpi, 15cpi, Proportional
EPSON Sans serif	10cpi, 12cpi, 15cpi, Proportional
EPSON OCR-B	10cpi*

* Not displayed in default setting mode.

❑ Bar codes

EAN-13	EAN-8	Interleaved 2 of 5
UPC-A	UPC-E	Code 39
Code 128	POSTNET	Coda bar (NW-7)*
Industrial 2 of 5 *	Matrix 2 of 5 *	

* Not displayed in default setting mode.

❑ Character tables and typefaces:

Table 7-15. Character Tables and Typefaces

	Character table		Bitmap font
Standard version	Italic table PC 437 (US, Standard Europe)		EPSON Draft EPSON Roman EPSON Sans serif EPSON OCR-B
	PC 850 (Multilingual) PC 860 (Portuguese) PC 863(Canadian-French) PC 865 (Nordic) PC 861 (Icelandic)	BRASCII Abicomp Roman 8 ISO Latin 1 PC 858 ISO 8859-15	EPSON Draft EPSON Roman EPSON Sans serif

Table 7-15. Character Tables and Typefaces (continued)

	Character table		Bitmap font
NLSP version	Italic table PC 437(US, Standard Europe)		EPSON Draft EPSON Roman EPSON Sans serif EPSON OCR-B
	PC 860(Portuguese) PC 865(Nordic) BRASCII Roman 8 PC437 (Greek) PC 855 (Cyrillic) PC 857 (Turkish) PC 869 (Greek) Code MJK (CSFR) ISO Latin 1T (Turkish) PC774 (LST 1283: 1993) 1SO 8859-2 PC 866 UKR (Ukrania) PC 708 (Arabic) PCAR864 (Arabic) Hebrew 8* PC 858 PC771 (Lithuania)	PC 850 (Multilingual) PC 861 (Icelandic) PC863 (Canadian-French) Abicomp ISOLatin1 PC 853 (Turkish) PC 852 (East Europe) PC 866 (Russian) MAZOWIA (Poland) ISO 8859-7 (Latin/Greek) Bulgaria (Bulgarian) Estonia (Estonia) PC 866 LAT. (Latvian) PC APTEC (Arabic) PC 720 (Arabic) Hebrew7* PC862 (Hebrew)* ISO 8859-15	EPSON Draft EPSON Roman EPSON Sans serif

* Not displayed in default setting mode.

NOTE: *ESC R command is effective in all the character tables.*

7.2.2 Paper Feeding

❑ Feeding method: Friction feed (rear)
                     Push tractor feed (rear)
                     Push and Pull tractor feed (rear)
                     Pull tractor feed (rear, bottom)

❑ Feeder: Rear push tractor, CSF single-bin (Option),
                     Pull tractor (Option) and Roll paper holder (Option)

❑ Paper path: Manual insertion   Rear in, top out
                     CSF   Rear in, top out
                     Push Tractor   Rear in, top out
                     Pull Tractor   Rear or bottom in, top out

❑ Line spacing: 4.23 mm (1/6 inch) or programmable
                     in increments of 0.118 mm (1/216 inch)

❑ Feed speed: 4.23 mm (1/6 inch feed)   88 msec
                     Continuous feed   0.76 MPS (m/sec)
                                                [3.0 IPS (inches/sec)]

❑ Input Data Buffer: 8 Kbyte

❑ Release lever:
   The release lever must be set according to the following tables:

Table 7-16. Release Lever in Friction Position

Paper path or feeder	Paper or media
Manual insertion (rear)	Cut sheet (Single sheet and Multi part) Envelope
CSF single-bin	Cut sheet (Single sheet)
Roll paper holder (rear)	Roll paper

Table 7-17. Release Lever in Tractor Position

Paper path or feeder	Paper or media
Push tractor feed (rear)	Continuous paper (Single sheet and Multi part)
Push and Pull tractor feed (rear)	Continuous paper (Single sheet and Multi part)
Pull tractor feed (rear)	Continuous paper (Single sheet and Multi part)
Pull tractor feed (bottom)	Continuous paper (Single sheet and Multi part) Labels

❑ Paper thickness lever:
   The paper thickness lever must be set at the proper position as shown below.

Table 7-18. Paper Thickness Lever

Lever position	Paper thickness (inch)		Paper thickness (mm)
	Minimum	Maximum	
0	(0.0024)	(0.0071)	0.06 to 0.18
1	(0.0071)	(0.0102)	0.18 to 0.26
2	(0.0102)	(0.0130)	0.26 to 0.33
3	(0.0130)	(0.0154)	0.33 to 0.39
4	(0.0154)	(0.0205)	0.39 to 0.52

7.2.3 Electrical Specification

❑ 120 V version

- ■ Rated voltage: AC 120V

- ■ Input voltage range: AC 99 to 132 V

- ■ Rated frequency range: 50 to 60 Hz

- ■ Input frequency range: 49.5 to 60.5 Hz

- ■ Rated current: 0.6 A (max. 1.4 A)

- ■ Power consumption: approx. 23 W (ISO/IEC 10561 Letter pattern)

- ■ Insulation resistance: 10MΩ min.
  (between AC line and chassis, 500 VDC)

- ■ Dielectric strength: AC 1000 Vrms. 1 min. or
  AC 1200 Vrms. 1 sec.
  (between AC line and chassis)

❑ 230 V version

- ■ Rated voltage range: AC 220 to 240 V

- ■ Input voltage range: AC 198 to 264 V

- ■ Rated frequency range: 50 to 60 Hz

- ■ Input frequency range: 49.5 to 60.5 Hz

- ■ Rated current: 0.3 A (max. 0.7 A)

- ■ Power consumption: approx. 23 W (ISO/IEC10561 Letter pattern)

- ■ Insulation resistance: 10MΩ min.
  (between AC line and chassis, 500 VDC)

- ■ Dielectric strength: AC 1500 Vrms. 1 min.
  (between AC line and chassis)

7.2.4 Environmental Condition

❑ Temperature:5 to 35 °C (operating[1])
    15 to 25 °C (operating[1],[2])
    -30 to 60 °C (non-operating)

❑ Humidity:10 to 80% RH (operating[1])
    30 to 60% RH (operating[1],[2])
    0 to 85% RH (non-operating)

❑ Resistance to shock:1 G, within 1ms (operating)
    2 G, within 2ms (non-operating[3])

❑ Resistance to vibration:0.25 G, 10 to 55 Hz (operating)
    0.50 G, 10 to 55 Hz (non-operating[3])

> *[1]: without condensation*
> *[2]: printing on multipart paper, envelopes, cards, or labels*
> *[3]: without shipping container*

7.2.5 Reliability

❑ Total print volume:12 million lines (except printhead)

❑ MTBF:6000 POH

❑ Printhead life: 400 million strokes / pin (Black)
    100 million strokes / pin (Color)

7.2.6 Ribbon Cartridge

❑ Type:Fabric
  Color:Black
  Ribbon life:3 million characters (Draft 10 cpi, 14 dots/character)

❑ Type:Fabric
  Color:Black, Magenta, Cyan and Yellow
  Ribbon life:

- ■ Black   1 million characters (Draft 10 cpi, 14 dots/character)

- ■ Magenta   0.7 million characters (Draft 10 cpi, 14 dots/character)

- ■ Cyan   0.7 million characters (Draft 10 cpi, 14 dots/character)

- ■ Yellow   0.5 million characters (Draft 10 cpi, 14 dots/character)

7.2.7 Safety Approvals

❑ 120 V version

- ■ Safety standards: UL1950
  CSA C22.2 No. 950

- ■ EMI: FCC part15 subpart B class B
  CSA C108.8 class B

❑ 230 V version

- ■ Safety standards: EN60950 (VDE)

- ■ EMI: EN55022 (CISPR pub.22) class B
  AS/NZS 3548 class B

7.2.8 CE Marking

230 V version and UPS version

- ■ Low voltage directive 73/23/EEC: EN60950

- ■ EMC Directive 89/336/EEC: EN55022 class B
  EN61000-3-2
  EN61000-3-3
  EN50082-1
  IEC801-2
  IEC801-3
  IEC801-4

7.2.9 Acoustic noise

Level: 49 dB(A) (ISO 7779 pattern)

7.2.10 Printable Area

❑ Cut sheets
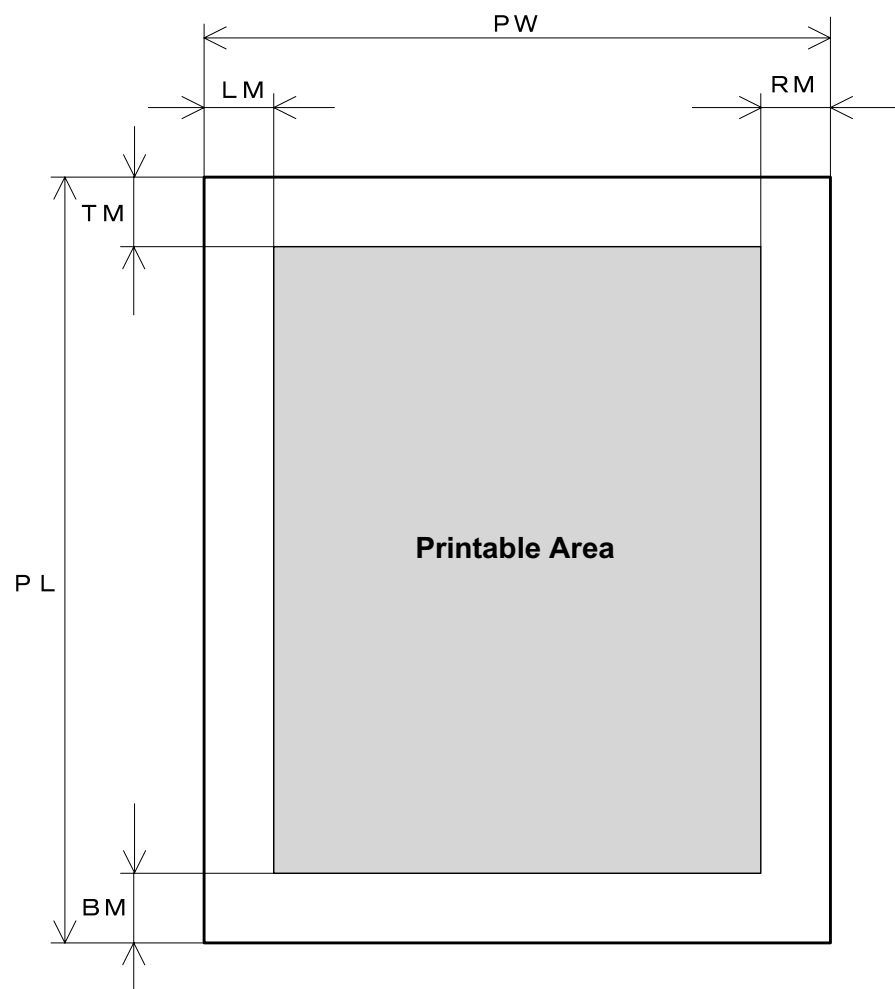
Figure 7-2. Printable Area for Cut Sheets

Table 7-19. Printable Area for Cut Sheets

	Single Sheet	Multi Part
PW (Width)	Refer to "Paper Specifications" on page 96	Refer to "Paper Specifications" on page 96
PL (Length)	Refer to "Paper Specifications" on page 96	Refer to "Paper Specifications" on page 96
LM (Left Margin)	When PW<=229 mm: 3 mm or more When PW=257 mm: 24 mm or more	When PW<=229 mm: 3 mm or more When PW=257 mm: 24 mm or more
RM (Right Margin)	When PW<=229 mm: 3 mm or more When PW=257 mm: 24 mm or more	When PW<=229 mm: 3 mm or more When PW=257 mm: 24 mm or more
TM (Top Margin)	4.2 mm or more	4.2 mm or more
BM (Bottom Margin)	4.2 mm or more	4.2 mm or more

NOTE: *The maximum horizontal printable area is 203.2 mm.*

❑ Envelopes
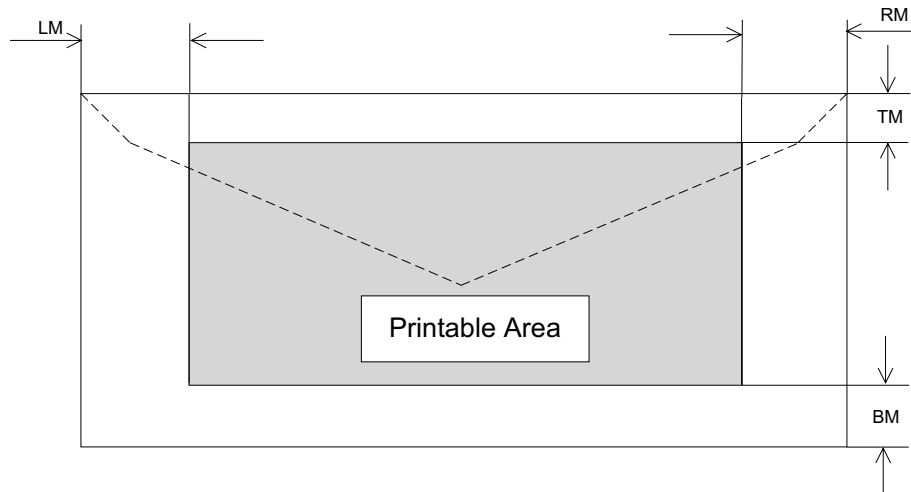
Figure 7-3. Printable Area for Envelopes

Table 7-20. Printable Area for Envelop

	Envelope Printable Area
PW (Width)	Refer to "Paper Specifications" on page 96
PL (Length)	Refer to "Paper Specifications" on page 96
LM (Left Margin)	3 mm or more
RM (Right Margin)	3 mm or more
TM (Top Margin)	4.2 mm or more
BM (Bottom Margin)	4.2 mm or more

NOTE: *The maximum horizontal printable area is 203.2mm.*

❑ Continuous paper
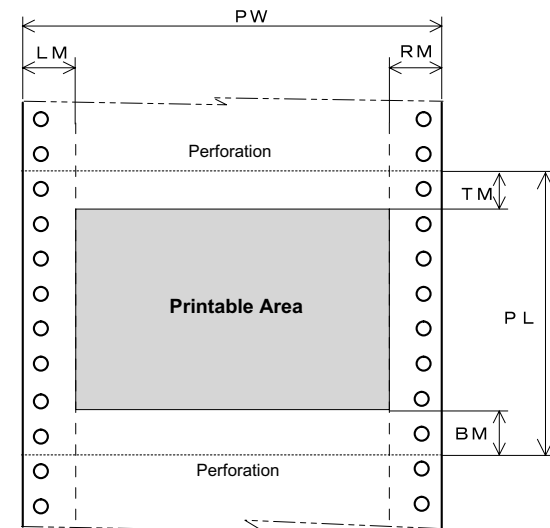
Figure 7-4. Printable Area for Continuous Paper

Table 7-21. Printable Area for Continuous Paper

	Continuous Paper
PW (Width)	Refer to "Paper Specifications" on page 96
PL (Length)	Refer to "Paper Specifications" on page 96
LM (Left Margin)	When PW<=254mm: 13 mm or more When PW=254 mm: 24mm or more
RM (Right Margin)	When PW<=254mm: 13 mm or more When PW=254 mm: 24mm or more
TM (Top Margin)	4.2 mm or more
BM (Bottom Margin)	4.2 mm or more

NOTE: *The maximum horizontal printable area is 203.2mm.*

❑ Roll paper
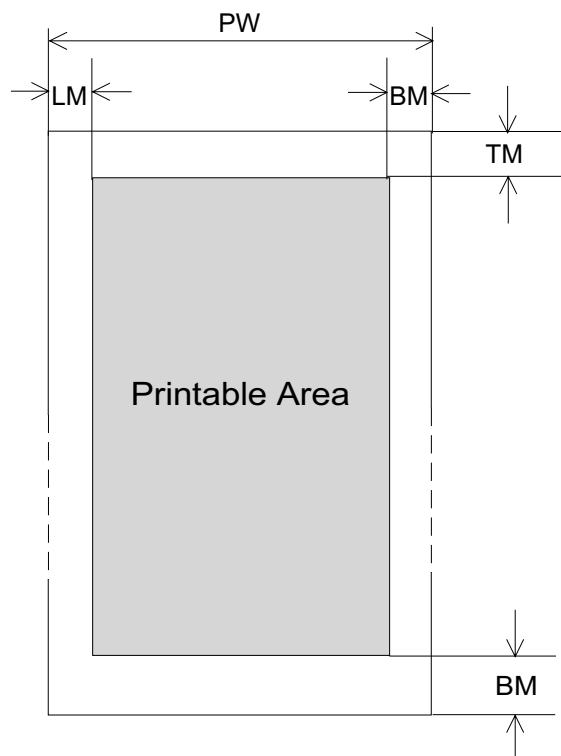
Figure 7-5. Printable Area for Roll Paper

Table 7-22. Printable Area for Roll Paper

	Continuous Paper
PW (Width)	Refer to "Paper Specifications" on page 96
PL (Length)	Refer to "Paper Specifications" on page 96
LM (Left Margin)	3 mm or more
RM (Right Margin)	3 mm or more
TM (Top Margin)	4.2 mm or more
BM (Bottom Margin)	4.2 mm or more

7.3 Interface Specifications

The LX-300+ has bi-directional 8-bit parallel and serial interfaces. An optional interface board is not supported on this model.

7.3.1 Parallel Interface (Forward Channel)

❑ Transmission mode:8 bit parallel
    IEEE-1284 compatibility mode

❑ Adaptable connector:57-30360 (Amphenol) or equivalent

❑ Synchronization:$\overline{\text{STROBE}}$ pulse

❑ Handshaking:BUSY and $\overline{\text{ACKLG}}$ signals

❑ Signal level:TTL compatible
    (IEEE-1284 level 1 device)

Table 7-23. Electrical Characteristics

I/O	Voltage	Current	Capacitance
Output	-0.5 to 5.5 V	0.32 (when V_O=2.4V) to 12 mA (when V_O=0.8 V)	50 pF
Input	0.8 to 2.0 V	0.32 mA (when V_I=2.0V) to 12 mA (when V_I=0.8V)	50 pF

* A HIGH logic signal is 2.0 V or less when the printer is off, and 3.0 V or more when the printer is on. The receiver has an impedance equivalent to 7.5 kΩ.
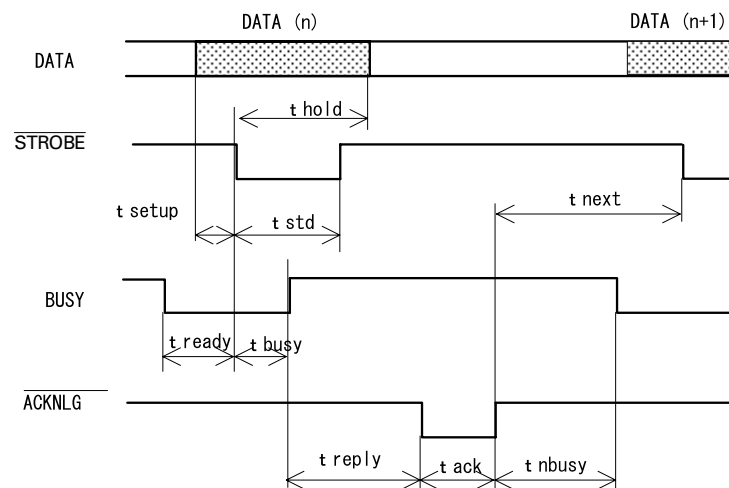
Figure 7-6. Data Transmitting Timing

Table 7-24. Min and Max Times for Data Transmission Signals

Parameter	Minimum	Maximum
t_{setup}	500 nsec	--
t_{hold}	500 nsec	--
t_{stb}	500 nsec	--
t_{ready}	0	--
t_{busy}	--	500 nsec
t_{reply}	--	--
t^{ack}	500 nsec	10 us
t_{nbusy}	0	--
t_{next}	0	--
t_{tout}*	--	120 nsec
t_{tin}*	--	200 nsec

* Rise and fall time of output or input signal

❑ BUSY signal is active (HIGH level) under the conditions below:

- In the process of receiving data

- In the condition of being input buffer full

- In the condition of being $\overline{\text{INT}}$ signal active (low level)

- During hardware initialization

- In the condition of being $\overline{\text{ERROR}}$ or PE signal is active (low level, high level, respectively)

- In the self test mode

- In the adjustment mode

- In the default-setting mode

❑ $\overline{\text{ERROR}}$ signal is active (low level) under the conditions below:

- In the condition of a paper-out error

- In the condition of a release lever error

- PE signal is active (high level) during a paper-out error

Table 7-25. Pin Signals

Pin No.	Signal Name	Return GND Pin	In/Out	Functional Description
1	-STROBE	19	In	Strobe pulse. Input data is latched at falling edge of the signal.
2	DATA1	20	In	Parallel input data to the printer. bit0:LSB
3	DATA2	21	In	bit1
4	DATA3	22	In	bit2
5	DATA4	23	In	bit3
6	DATA5	24	In	bit4
7	DATA6	25	In	bit5
8	DATA7	26	In	bit6
9	DATA8	27	In	bit7:MSB

Table 7-25. Pin Signals (continued)

Pin No.	Signal Name	Return GND Pin	In/Out	Functional Description
10	-ACKNLG	28	Out	This signal (negative pulse) indicates that the printer has received data and is ready to accept next data.
11	BUSY	29	Out	This signal's high level means that the printer is not ready to accept data.
12	PE	28	Out	This signal's high level means that the printer has a paper-out error.
13	SLCT	28	Out	Always at high level when the printer is powered on.
14	-AFXT	30	In	Not used
31	-INIT	30	In	This signal's negative pulse initializes printer.
32	-ERROR	29	Out	This signal's low level means the printer is in an error state.
36	-SLIN	30	In	Not used
18	Logic H	--	Out	This line is pulled up to +5V through 3.9 kΩ resister.
35	+5V	--	Out	This line is pulled up to +5V through 1.0 kΩ resister.
17	Chassis	--	--	Chassis GND
16, 33, 19-30	GND	--	--	Signal GND
15, 34	NC	--	--	Not connected

NOTE: *In/Out indicates the direction of signal flow from the printer's point of view.*

7.3.2 Parallel Interface (Reverse Channel)

❑ Transmission mode:IEEE-1284 nibble mode

❑ Adaptable connector:See 7.3.1 "Parallel Interface (Forward Channel)"

❑ Synchronization:Refer to the IEEE-1284 specification

❑ Handshaking:Refer to the IEEE-1284 specification

❑ Signal level:IEEE-1284 level 1 device
   See 7.3.1 "Parallel Interface (Forward Channel)"

❑ Data transmission timing:Refer to the IEEE-1284 specification

❑ Extensibility request:The printer responds to the extensibility request affirmatively, when the request is 00H or 004H, which means:

   00H: Request for nibble mode of reverse channel transfer
   04H: Request device ID in nibble mode of reverse channel transfer

❑ Device ID: The printer sends following device ID string when it is requested:

   ■ When IEEE1284.4 is enabled:

      Table 7-26.

      ```
      [00H][4EH]
      MFG: EPSON;
      CMD: ESCPL2,PRPXL24,BDC,D4;
      MDL: LX-300+;
      CLS: PRINTER;
      DES: EPSON[SP]LX-300+;
      ```

   ■ When IEEE1284.4 is disabled:

      Table 7-27.

      ```
      [00H][4BH]
      MFG: EPSON;
      CMD: ESCPL2,PRPXL24,BDC;
      MDL: LX-300+;
      CLS: PRINTER;
      DES: EPSON[SP]LX-300+;
      ```

Table 7-28. Pin Signals

Pin No.	Signal Name	Return GND Pin	In/Out	Functional Description
1	HostClk	19	In	Host clock signal.
2	DATA1	20	In	Parallel input data to the printer. bit0:LSB
3	DATA2	21	In	bit1
4	DATA3	22	In	bit2
5	DATA4	23	In	bit3
6	DATA5	24	In	bit4
7	DATA6	25	In	bit5
8	DATA7	26	In	bit6
9	DATA8	27	In	bit7:MSB
10	PtrClk	28	Out	Printer clock signal
11	PtrBusy/ DataBit-3,7	29	Out	Printer busy signal and reverse channel transfer data bit 3 or 7.
12	AckDataReq/ DataBit-2,6	28	Out	Acknowledge data request signal and reverse channel transfer data bit 2 or 6.
13	Xflag/ DataBit-1,5	28	Out	X-flag signal and reverse channel transfer data bit 1 or 5.
14	HostBusy	30	In	Host busy signal.
31	-INIT	30	In	Not used
32	-DataAvail/ DataBit-0,4	29	Out	Data available signal and reverse channel transfer data bit 0 or 4.
36	1284-Active	30	In	1284 active signal
18	Logic-H	--	Out	This line is pulled up to +5V through 3.9 kΩ resister.

Table 7-28. Pin Signals (continued)

Pin No.	Signal Name	Return GND Pin	In/Out	Functional Description
35	+5V	--	Out	This line is pulled up tp +5V through 1.0 kΩ resister.
17	Chassis	--	--	Chassis GND.
16, 33, 19-30	GND	--	--	Signal GND.
15, 34	NC	--	--	Not connected.

* In/Out indicates the direction of signal flow from the printer's point of view.

7.3.3 Serial Interface

❑ Synchronization: Asynchronous

❑ Signal level: EIA-232D
        MARK (logical 1):   -3V to -25V
        SPACE (logical 0): +3V to +25V

❑ Word length: Start bit: 1 bit
        Data bit: 8 bit
        Parity bit: Odd, Even, Non, Ignore
        Stop bit: 1 bit or more

❑ Baud rate: 300, 600, 1200, 2400, 4800, 9600 or 19200 bps

❑ Handshaking: DTR signal and XON/XOFF
DTR=MARK, XOFF: indicates that the printer cannot receive data
DTR=MARK, XON: indicates that the printer is ready for data

NOTE: *The DTR signal goes to MARK and the XOFF code (DC3, 13H) is transmitted when the input buffer drops below 256 bytes. The DTR signal is set to SPACE and the XON code (DC1, 11H) is transmitted when the input buffer recovers 256 bytes.*

❑ Error handling: Parity error only is detected. Overrun error and framing error are ignored.

❑ Connector: 25 pin subminiature D-shell connector (female)

Table 7-29. Pin Signals

Pin No.	Signal Name	In/Out	Functional Description
2	TXD	Out	Transmit data.
20	DTR	Out	Indicates that the printer is ready to receive data or not.
11	REV	Out	Connected directly to the DTR signal.
4	RTS	Out	Request to send. Always SPACE level when the printer is powered on. Pulled up to +12V via 4.7KΩ resistor.
3	RXD	In	Receive data.
7	Signal GND	--	Signal GND
1	Chassis GND	--	Chassis GND
other	NC	--	Not used. Not connected.

* In/Out indicates the direction of signal flow from the printer's point of view.

7.3.4 Interface Selection

The printer has two interfaces: parallel and serial. These interfaces can be selected manually as a Default Setting or selected automatically by the printer:

❑ Manual Selection
One of two interfaces can be selected in Default Setting mode.

❑ Automatic Selection
Automatic interface selection is enabled as a Default Setting. In this mode, the interface that receives data first after printer initialization is selected. As long as the host sends data or the printer interface is busy, the selected interface remains the same. When the host stops sending data and the printer is in standby for the length of time specified in the default settings, the interface de-selects.

❑ Interface State and Interface Selection
When the parallel interface is not selected, it goes into a busy state. When the serial interface is not selected, it sends an XOFF signal and then sets the DTR signal to MARK.
When the printer is initialized or returned to the idle state, the parallel interface goes into the ready state, and the serial interface sends an XON signal and then sets DTR to SPACE.
Interrupt signals, such as $\overline{INIT}$ on the parallel interface, are not effective if an interface is not selected.

7.3.5 Preventing Data Transfer Time-out

Generally, host computers abandon data transmission when a peripheral is busy for a certain length of time. To prevent this, the printer begins receiving data slowly, several bytes per minute, when the space in the input buffer drops to several hundred bytes. If the input buffer fills up completely, the printer enters the busy state.

7.3.6 IEEE1284.4 protocol

The packet protocol described by IEEE1284.4 is supported on the parallel interface. Two function modes of IEEE1284.4 protocol, "Off" and "Auto," are available; the desired mode is selected as a default setting. (See "Default Setting Mode" on page 16.)

❑ Auto:
Communication is carried out in the conventional mode until a magic string (1284.4 synchronous command) is received. This initiates communication in IEEE1284.4 packet mode.

❑ Off:
Communication is carried out in the conventional mode. Magic strings (1284.4 synchronous commands) are discarded.

NOTE: *The packet protocol of IEEE1284.4 allows a device to carry on multiple exchanges or conversations containing data and control information with another device across a single point-to-point link. The multiplexed logic channels are independent of each other, and blocking of one has no effect on the others. The protocol is not a device control language, but only provides basic data flow control and multiplexing services.*

7.4 Control Codes

7.4.1 ESC/P2

Table 7-30. ESC/P2

Classification	Operation	Command
General Operation	Initialize Printer	ESC@
	Unidirectional Printing	ESC U
	CSF Mode Control	ESC EM
Paper feeding	Form Feed	FF
	Line Feed	LF
	Line Spacing	ESC 0, ESC 2, ESC3, ESC A
	Carriage Return	CR
Page format	Page Length	ESC C, ESC C0, ESC (C
	Left / Right Margin	ESC Q, ESC1
	Top / Bottom Margin	ESC N, ESC O, ESC (c
	Define Unit	ESC (U
Print position motion	Horizontal Print Position	ESC$, ESC¥
	Vertical Print Position	ESC (V, ESC (v
	Tab Horizontally	ESC D, HT
	Tab Vertically	ESC B, VT
	Advance paper	ESC J
Font selection	Typeface	ESC k, ESC x, ESC y
	Pitch	ESC P, ESC M, ESC g, ESC p
	Italic Font	ESC 4, ESC 5
	Bold Font	ESC E, ESC F
	Master Select	ESC!

Table 7-30. ESC/P2

Classification	Operation	Command
Font enhancement	Double-Width	ESC W, DC4, SO
	Condensed	DC2, SI
	Double-height	ESC w
	Double-Strike	ESC G, ESC H
	Super-/ Subscript	ESC T, ESC S
	Underline	ESC-
Spacing	Intercharacter Space	ESC Space
Character handling	Character Table	ESC t, ESC (t
	International Character	ESC R
	User-Defined Characters	ESC%, ESC &, ESC:
	Control code selection	ESC1
	Upper Control Codes	ESC6, ESC7
Bit image	8 pin Bit Image	ESC K, ESC L, ESC Y, ESC Z, ESC*
	9 pin Bit Image	ESC ^
Printing color	Select color	ESC r
Bar code	Bar code	ESC (B
Production	EEPROM write, etc.	ESC|

7.4.2 IBM 2390 Plus Emulation

Table 7-31. IBM 2390 Plus emulation

Classification	Operation	Command
General Operation	Nop	NUL, DC3
	Off Line	ESC j
	Buzzer	BEL
	Cancellation	CAN
	Select / Deselect	DC1, ESC Q
	Initialize Printer	ESC [K
	Unidirectional Printing	ESC U
	Select Auto Sheet Feeder	ESC [F
Paper feeding	Form Feed	FF
	Line Feed, Auto Line Feed	LF, ESC5
	Line Spacing	ESC A, ESC 0, ESC 1, ESC 2, ESC3
	Carriage Return	CR
	Reverse Line Feed	ESC]
Page format	Page Length	ESC C, ESC C0
	Left / Right Margin	ESC X
	Skip Over Perforation	ESC N, ESC O
	Set TOF	ESC 4
Print position motion	Horizontal Print Position	ESC d
	Initialize Tab Position	ESC R
	Tab Horizontally	ESC D, HT
	Tab Vertically	ESC B, VT
	Advance paper	ESC J

Table 7-31. IBM 2390 Plus emulation

Classification	Operation	Command
Font selection	Pitch	DC 2, ESC P, ESC:
	Bold Font	ESC E, ESC F
	Master Select	ESC I
	Print Quality	ESC [d
	Select Font and Pitch	ESC [I
Font enhancement	Double-Width	DC4, SO, ESC SO, ESC W
	Enlarge and Life Space	ESC [@
	Condensed	SI, ESC SI
	Double-Strike	ESC G, ESC H
	Super-/ Subscript	ESC T, ESC S
	Underline	ESC -
	Line / Score	ESC_
Spacing	Back Space	BS
	Space	SP
	Define Unit	ESC [¥
Character handling	Character Table	ESC 6, ESC 7, ESC [T
	Print Data as Characters	ESC ^, ESC¥
Bit image	Bit Image	ESC K, ESC L, ESC Y, ESC Z
Bar code	Set up Bar code	ESC [f
	Transfer Bar code	ESC [p
Download	Download	ESC=(only Draft mode)

7.4.3 Bi-Directional Commands

❑ Reply printer ID

Reply printer ID: [ESC][SOH]@EJL[SP]ID[CR][LF]
The printer sends the following ID string in reply to this command:

Table 7-32.

```
@EJL[SP]ID[CR][LF]
MFG: EPSON;
CMD: ESCPL2,PRPXL24,BDC;
MDL: LX-300+;
CLS: PRINTER;
DES: EPSON[SP]LX-300+;
[FF]
```

❑ Enter / Exit Remote Mode

  ■ Enter Remote Mode: [ESC](R[08H][00H][00H]REMOTE1

  ■ Exit Remote Mode: [ESC][NUL][00H][00H]

❑ Remote Commands

  ■ Change Printer Settings: XX[nL][nH][00H][ml]...[mx]

  ■ Reply Printer Settings: XX[nL][nH][01H][ml]...[mx]

XX is a string of 2 ASCII characters defining a feature of the command. Following [nL][nH] is a two-byte hexadecimal value that denotes the length of the [00H] and [ml]...[mx] parameters. Last, [m1] ... [mx] parameters are used to describe the detailed command function and represent printer settings.

The printer sends the following string in reply to the commands of this type:

   @BDC[sp]PS[CR][LF]
   XX: Reply-Data;
   [FF]

Table 7-33 lists the bi-directional commands that can be used with this printer. The column on the right indicates the parameters that can be saved by an SV command:

Table 7-33. Bi-Directional Commands

Function	Code/ Parameter	Parameters saved
Enter Remote-1	ESC"(R"08H 00H 00H "REMOTE1"	—
Exit Remote-1	ESC 00H 00H 00H	—
Save settings	"SV" 00H 00H	—
Initialize	"RS" 00H 00H	—
Load power-on default	"LD" 00H 00H	—
Select typeface	"FO" 02H 00H 00H m1 m1=0(Roman), 1(Sans serif), 5(OCR-B)	m1= 0 to 1 only
Select character pitch	"CP" 02H 00H 00H m1 m1=0(10cpi), 1(12cpi), 2(15cpi), 3 (17.1cpi), 4(20cpi), 5(Propotional)	all parameters saved
Select draft or NLQ	"CQ" 02H 00H 00H m1 m1=0(Draft), 1(LQ), 2(High speed draft)	all parameters saved
Select character table	"CT" 02H 00H 00H m1 m1=0 (Table0), 1(Table1)	See Table 7-34
Assign character table	"AT" 04H 00H 00H m1 m2 m3 m1=0(Table0), 1(Table1) m2, m3=(ESC/P2 Character Table No.)*4	See Table 7-34, Table 7-35, and Table 7-36
Select an international character set	"IC" 02H 00H 00H m1 m1=0(U.S.A), 1(France), 2(Germany), 3(U.K.) 4(Denmark1), 5(Sweden), 6(Italy), 7(Spain1), 8(Japan), 9(Norway), 10(Denmark2), 11(Spain2), 12(Latin America)	m1 = 0 to 7 only

Table 7-33. Bi-Directional Commands (continued)

Function	Code/ Parameter	Parameters saved
Turn 1 inch skip perforation on/off	"SK" 02H 00H 00H m1 m1=0(off), 1(on)	all parameters saved
Set page length	"PG" 05H 00H 00H p1 p2 m1 m2 p1=0(Continuous paper), p2=0(Rear), p1=1(CSF), p2=0(bin1) p1=2(Manual insertion), p2=0(rear) -Page legth=m1+256*m2, 0.118mm (1/216inch) 648 (76.2mm(3inch)) <= m1+256*m2 <= 4752(558.8mm(22 inch))	all parameters saved
Set Top margin	"TP" 05H 00H 00H p1 p1 m1 m2 p1=0(Continuous paper), p2=0(Rear), p1=1(CSF), p2=0(bin1) p1=2(Manual insertion), p2=0(rear) -Top margin=m1+256*m2, 0.118mm (1/216inch) 36 (4.2mm) <= m1+256*m2 <= 288 (8.5mm + 25.4mm(1inch))	all parameters saved
Turn unidirectional mode on/off	"PD" 02H 00H 00H m1 m1=0(Bi-d.), 1(Uni-d.)	all parameters saved
Turn auto tear-off on/off	"TO" 02H 00H 00H m1 m1=0(off), 1(on)	all parameters saved
Turn auto line feed on/off	"LF" 02H 00H 00H m1 m1=0(off), 1(on)	all parameters saved
Select control language	"PM" 02H 00H 00H m1 m1=0(ESC/P), 2(IBM 238x Plus emulation)	all parameters saved
Turn printer state reply on/off	"ST" 02H 00H 00H m1 m1=0, 1, 2, 3	—
Turn Slash zero on/off	"EX" 06H 00H 00H 00H 00H 00H 01H m1 m1=0(off), 1(on)	all parameters saved

Table 7-33. Bi-Directional Commands (continued)

Function	Code/ Parameter	Parameters saved
Turn Buzzer on/off	"EX" 06H 00H 00H 00H 00H 00H 02H m1 m1=0(enable), 1(disable)	all parameters saved
Turn IBM emulation Auto CR on/off	"EX" 06H 00H 00H 00H 00H 00H 04H m1 m1=0(off), 1(on)	all parameters saved
Set starting data/month/year	"SD" 04H 00H 00H m1 m2 m3 00<=m1<=99, 01<=m2<=12, 01<=m3<=31	all parameters saved
Inquire printer state reply on/off	"ST" 01H 00H 01H "@BDC" SP "PS" CR LF "ST:" <nn> ";" FF	—
Echo parameters	"??" nL nH 01H <chr-str> "@BDC" SP "PS" CR LF "??:" <chr-str> ";" FF	—
Inquire starting date/month/year	"SD" 01H 00H 01H "@BDC" SP "PS" CR LF "SD:" <nn1> <nn2> <nn3>";" FF	—
Inquire total printing lines/power on hours	"TL" 01H 00H 01H "@BDC" SP "PS" CR LF "TL:" ";" "TPL:" <nnnnnnnn2> ";" "TPH:" <nnnn3>";" "TPR:" <nnnnnnnn4> ";" FF	—

The following tables (referenced above) provide additional information about certain saved parameters:

Table 7-34. Saved Parameters (1)

m1 set by AT/CT	m2 set by AT	m3 set by AT
0	0	0
1	All parameters that can be set	

Table 7-35. Saved Parameters (2): Std and NLSP versions

m2	m3	Character table	m2	m3	Character table
00H	00H	Italic	19H	00H	BRASCII
01H	00H	PC437	1AH	00H	Abicomp
03H	00H	PC850	7FH	01H	ISO Latin1
07H	00H	PC860	23H	00H	Roman8
08H	00H	PC863	2CH	00H	PC858
09H	00H	PC865	1DH	0FH	ISO 8859-15
18H	00H	PC861			

Table 7-36. saved Parameters (3): NLSP version only

m2	m3	Character table	m2	m3	Character table
01H	10H	PC437 Greek	1CH	00H	Code MJK
05H	00H	PC853	1DH	07H	ISO 8859-7
06H	00H	PC855	1FH	00H	ISO Latin 1T
0AH	00H	PC852	20H	00H	Bulgaria
0BH	00H	PC857	21H	00H	Hebrew 7
0CH	00H	PC862	22H	00H	Hebrew 8
0DH	00H	PC864	24H	00H	PC 774
0EH	00H	PC866	25H	00H	Estonia
0EH	20H	PC866 LAT.	28H	00H	PC APTEC
0EH	30H	PC866 UKR	29H	00H	PC 708
0FH	00H	PC869	2AH	00H	PC720
0DH	20H	PCAR_864	7FH	02H	ISO 8859-2
1BH	00H	MAZOWIA	2DH	00H	PC771

7.4.3.1 Reply Printer Status

The printer reports its status every few seconds by sending back one of the five strings shown below.

> "@BDC"SP "ST" CR LF
> "ST:" <status code>";"
> ["ER:" <error code>";"]
> ["PP:"<paper_path>";"]
> ["CD:"<printer status codes>";"]
> ["IG:"<nn1><nn2><n3>[","...<nnx1><nnx2><nnx3>]";"]
> ["TEC:"<ii1>";"]
> FF

See the following tables to interpret the meaning of the codes:

Table 7-37. Status Codes

Meaning	Code
In the error state	"00"
In the busy state	"02"
In the waiting state	"03"
In the idle state	"04"
In the pose state	"05"

Table 7-38. Error Codes

Meaning	Code
Fatal error	"00"
Port is not selected	"01"
Release lever position error	"03"
Paper out	"06"

Table 7-39. Paper Path Codes

Meaning	Code
Continuous paper (rear)	"0000"
Continuous paper (bottom)	"0001"
Cut sheet (rear)	"0200"
CSF Single bin	"0100"

Table 7-40. Characteristic Status Codes

	Location	Size	Type	Refer to
Structure version	+0	2bytes	"02" fixed	—
Starting date	+2	6bytes	"yy", "mm, "dd"	"SD" command
Total printing line number	+8	8bytes	"nnnnnnnn"	"TL" command
Total power on hour	+16	4bytes	"nnnn"	"TL" command
Total printing number for ribbon charge timing	+20	8bytes	"nnnnnnnn"	"TL" command

MIB proxy information is reported as follows:

"1G:"
"0305NA,"   Sheet feeder bin 1 (removable), capacity 5mm,
              quantity of paper N.A.

"09NANA,"   Manual feed rear, capacity N.A., quantity of paper N.A.
"0CNANA;"   Tractor rear, capacity N.A., quantity of paper N.A.
"TEC:06;"   9pin SIDM

7.4.3.2 Packet commands

Table 7-41. Packet Commands

Function	Code
Device ID request	"di" 01H 00H 01H
Device ID reply (*1)	"@EJL" SP "ID" CR LF <Device ID string> FF
State-Reply request	"st" 01H 00H 01H
State-Reply (*2)	"@BDC" SP "ST" CR LF <printer status string> FF
No support command	"XX:;" FF (XX is the invalid command string.)

NOTES: (*1) The reply string is as same as BDC-ID Reply.

(*2) The reply string is as same as BDC-ST Reply.

7.5 Paper Specifications

The following tables provide specifications for the kinds of paper that can be used with this printer:

Table 7-42. Cut Sheet (single sheet, not multi-part)

		Manual insertion		CSF single-bin	
		Minimum	Maximum	Minimum	Maximum
Width	(inch) (mm)	3.9 100	10.1 257	7.2 182	8.5 216
Length	(inch) (mm)	3.9 100	14.3 364	10.1 257	14.0 356
Thickness	(inch) (mm)	0.0025 0.065	0.0055 0.14	0.0028 0.07	0.0055 0.14
Weight	(g/m^2) (lb.)	52 14	90 24	64 18	90 24
Quality		Plain or recycled paper; should not be curled, folded, or crumpled		Plain or recycled paper; should not be curled, folded, or crumpled	

NOTE: *Printing on recycled paper is available only under normal temperature and humidity conditions.*

Table 7-43. Cut Sheet (multi-part)

		Minimum	Maximum
Width	(inch) (mm)	3.9 100	10.1 257
Length	(inch) (mm)	3.9 100	14.3 364
Copies		1 original + 4 copies	
Total Thickness	(inch) (mm)	0.0047 0.12	0.015 0.39
Weight (one sheet of multipart)	(g/m^2) (lb.)	52 14	90 24
Quality		Plain or recycled paper Not curled, folded, or crumpled	
Jointing		Glue strip on top or side of form	

NOTE: *Printing on recycled paper is available only under normal temperature and humidity conditions.*

Table 7-44. Envelopes

			Minimum	Maximum
Envelope (No. 6)	Width	(inch) (mm)	6.5 165	
	Length	(inch) (mm)	3.6 92	
Envelope (No. 10)	Width	(inch) (mm)	9.5 241	
	Length	(inch) (mm)	4.1 105	
Total Thickness		(inch) (mm)	0.0063 0.16	0.0205 0.52
			Thickness in the printable area varies no more than 0.25mm (0.0098 inch).	
Weight		(g/m²) (lb.)	45 12	90 24
Quality			Bond, plain, or air mail No glue at a flap Not curled, folded, or crumpled	

NOTE: Printing on recycled paper is available only under normal temperature and humidity conditions.

Table 7-45. Continuous Paper (single sheet and multi-part)

		Rear Entry		Bottom Entry	
		Min.	Max.	Min.	Max.
Width	(inch) (mm)	4 101.6	10 254	4 101.6	10 254
Length (one page)	(inch) (mm)	4 101.6	22 558.8	4 101.6	22 558.8
Copies		1 original + 4 copies		1 original + 4 copies	
Total Thickness	(inch) (mm)	0.0025 0.065	0.015 0.39	0.0025 0.065	0.015 0.39
Weight (not multipart)	(g/m²) (lb.)	52 14	82 22	52 14	82 22
Weight (one sheet of multipart)	(g/m²) (lb.)	40 12	58 15	40 12	58 15
Quality		Plain, recycled, or carbonless multipart paper		Plain, recycled, or carbonless multipart paper	
Jointing		Point glue or paper staple (both sides)		Point glue or paper staple (both sides)	

Table 7-46. Continuous Paper with Labels

		Rear Entry		Bottom Entry	
		Min.	Max.	Min.	Max.
Label size		---		See the figure below.	
Base sheet width	(inch) (mm)	---	---	4 101.6	10 254
Base sheet length (one page)	(inch) (mm)	---	---	4 101.6	22 558.8
Base sheet thickness	(inch) (mm)	---	---	0.0028 0.07	0.0035 0.09

		Rear Entry		Bottom Entry	
		Min.	Max.	Min.	Max.
Total thickness	(inch) (mm)	---	---	0.0063 0.16	0.0075 0.19
Label weight	(g/m^2) (lb.)	---		64 17	
Quality		---		AVERY continuous form labels, AVERY Mini-Line labels, or labels of similar quality	

NOTE: *Printing on labels is available only under normal temperature and humidity conditions.*

The base sheet of the labels must be continuous paper.

Continuous paper with labels should be inserted from the bottom entrance.
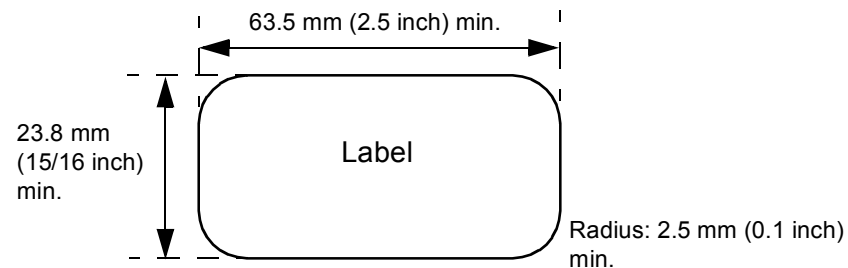
Figure 7-7. Minimum Label Size

Table 7-47. Roll Paper

		Minimum	Maximum
Width	(inch) (mm)	8.5 216	
Length	(inch) (mm)	- - -	
Thickness	(inch) (mm)	0.0028 0.07	0.0035 0.09
Weight	(g/m^2) (lb.)	52 14	82 22
Quality		Plain paper; not curled, folded, or crumpled	

7.6 Physical Specifications

❑ Without options:

- ■ Dimensions: 366 x 275 x 159 mm (WxDxH)
- ■ Mass: Approx. 4.4 kg

❑ With cut sheet feeder:

- ■ Dimensions: 366 x 441 x 370 mm (WxDxH)
- ■ Mass: Approx. 4.6 kg

Figure 7-9. Dimensions with CSF

Figure 7-8. Dimensions without Options

7.7 Parts List

Available printer parts are listed below. The number in the left-hand column refers to parts shown in the exploded diagrams on the following pages.

Table 7-48. Parts List

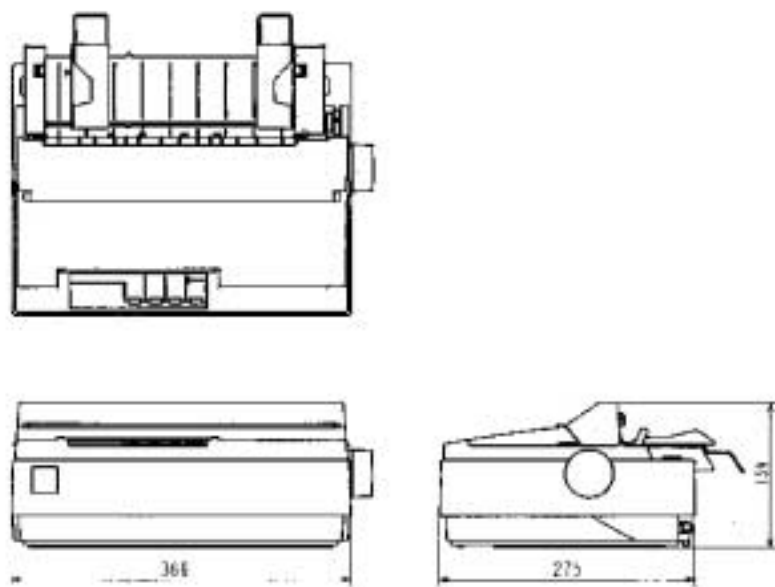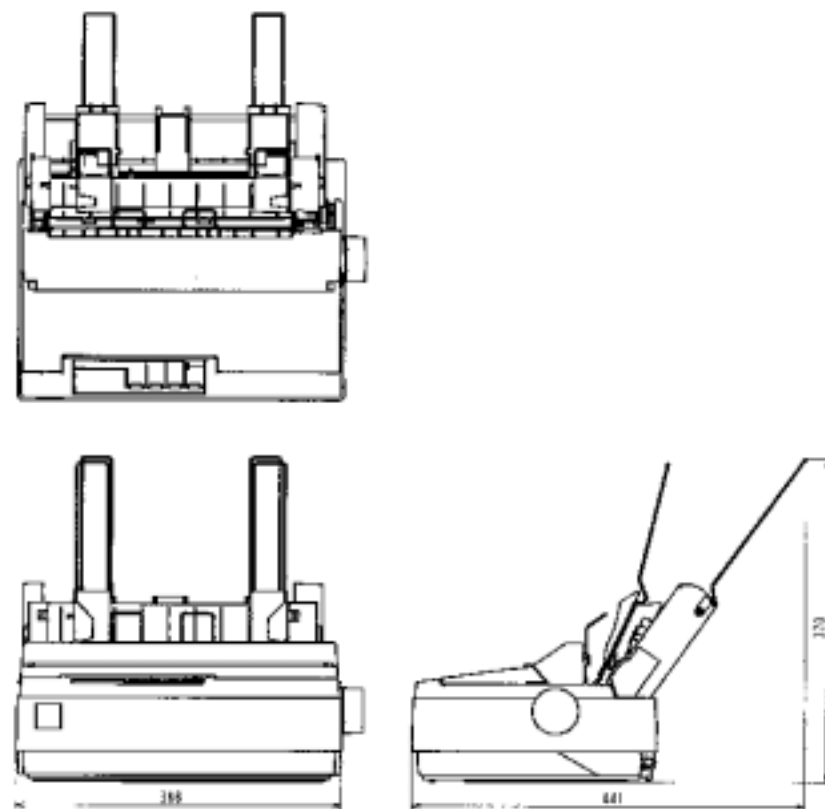| Number	Parts Name
100	"HOUSING ASSY.,LOWER"
101	INSULATOR;A
102	INSULATOR;B
103	"HOUSING,UPPER"
104	"SHIELDPLATE,LOWER"
105	"COVER ASSY.,PRINTER"
106	KNOB;W
109	SHEET GUIDE ASSY.
111	"SHIELDPLATE,UPPER"
115	"COVER CONNECTOR,CS;W"
116	HEXAGON NUT
117	GROUNDINGPLATE
118	"GROUNDING PLATE,PANEL"
119	EDGING;A
120	LOGO PLATE
123	"FERRITE CORE,FPC-25-20"
124	"SHEET,PROTECT"
125	CONNECTOR LOCK NUT
126	RIVET B-TITE(SCREW TYPE)
127	"C.B.P-TITE,3X10,F/ZN"
128	C.B.S. SCREW

Table 7-48. Parts List (continued)

Number	Parts Name
129	"C.B.B-TITE(P(13)),3X14,F/ZN"
130	C.B.(O) SCREW 4X8 F/ZG
131	C.P.SCREW
132	C.B.S. SCREW
180	"GUIDE,STACKER"
200	"BOARD ASSY.,MAIN"
320	HARNESS
300	"BOARD ASSY.,POWER SUPPLY"
400	POWER CABLE ASSY.
450	"BOARD ASSY.,PANEL"
451	"SHEET,PANEL"
500	"PRINTER MECHANISM,M-3M10-100"
501	"FRAME,LEFT"
502	"FRAME,RIGHT"
503	"MOTOR ASSY.,CR"
504	"EXTENSION SPRING,8.10"
505	"LEVER ASSY.,PLANET"
506	"SHAFT,CR,GUIDE"
509	"SPURGEAR,13.2"
510	"COMBINATIONGEAR,5.1,16.2"
511	"MOTOR ASSY.,PF"
512	"COVER,RD"
513	"RATCHET,RD"
514	"DETECTOR,LEAF,B1"
515	"GROUNDING WIRE,PLATEN"

Table 7-48. Parts List (continued)

Number	Parts Name
516	"PULLEY ASSY.,DRIVEN"
517	"HARNESS,HP"
518	C.P.B SCREW
520	PAPER GUIDE
521	"DETECTOR,PE,REAR"
522	"HARNESS,PE,REAR"
523	"DETECTOR,PE,BOTTOM"
524	"HARNESS,PE,BOTTOM"
525	"HOLDER,ROLLER,PF"
526	"ROLLER,PF,DRIVEN"
527	"ROLLER,PF,DRIVEN,REAR"
528	"COMPRESSION SPRING,13.72"
529	"SHAFT,RELEASE"
530	PAPER GUIDE ASSY.
531	RETAINING RING
532	"BUSHING,11"
533	"U-TYPE,11.2X0.13X16S/NA"
534	PLAIN WASHER
535	PLATEN
536	CARRIAGE ASSY.
537	"GROUNDING PALTE,HEAD"
538	OIL PAD
539	"LEVER,G,ADJUST"
540	RIBBON MASK
541	TIMING BELT

Table 7-48. Parts List (continued)

Number	Parts Name
542	"BUSHING,PARALLEL,ADJUST"
543	"CABLE,HEAD"
544	"HARNESS,PG"
545	"PAPER GUIDE,LOWER"
550	"SPURGEAR,17"
551	PAPERSUPPORT
552	"FRAME,TR,RIGHT"
553	"FRAME,TR,LEFT"
554	"TRACTOR,LEFT"
555	"TRACTOR,RIGHT"
556	"SHAFT,TR,GUIDE"
557	"SHAFT,TR,DRIVE"
558	RETAINING RING
559	DAMPER
560	"FRAME,BASE"
561	"PAPER GUIDE,SUPPORT"
562	"GROUNDING PALTE,SHAFT,CR"
563	"SHEET,CABLE,HEAD"
564	"GEAR,34"
565	"SPUR GEAR,27.5"
566	PLAIN WASHER
567	"COMPRESSION SPRING,1.18"
568	"COMBINATION GEAR,8.5,25.2"
569	"HARNESS,RELEASE"
570	PAPER EJECT ASSY.

Table 7-48. Parts List (continued)

Number	Parts Name
571	"COMBINATION GEAR,17.5,27"
573	"GROUNDING PLATE,CS"
574	"GROUNDING WIRE,LEFT"
575	"GROUNDING WIRE,RIGHT"
576	"GROUNDING PLATE,PF"
577	"SHEET,PROTECT,CABLE"
578	"SHEET,PROTECT,M/B"
579	"SHEET,CABLE,CR"
580	"C.B.P-TITE,3X10,F/ZN"
581	C.B.S. SCREW
590	"LEVER,RELEASE"
650	"PRINT HEAD,D3910-1"
651	"LABEL,WARNING"

7.8 Exploded Diagrams
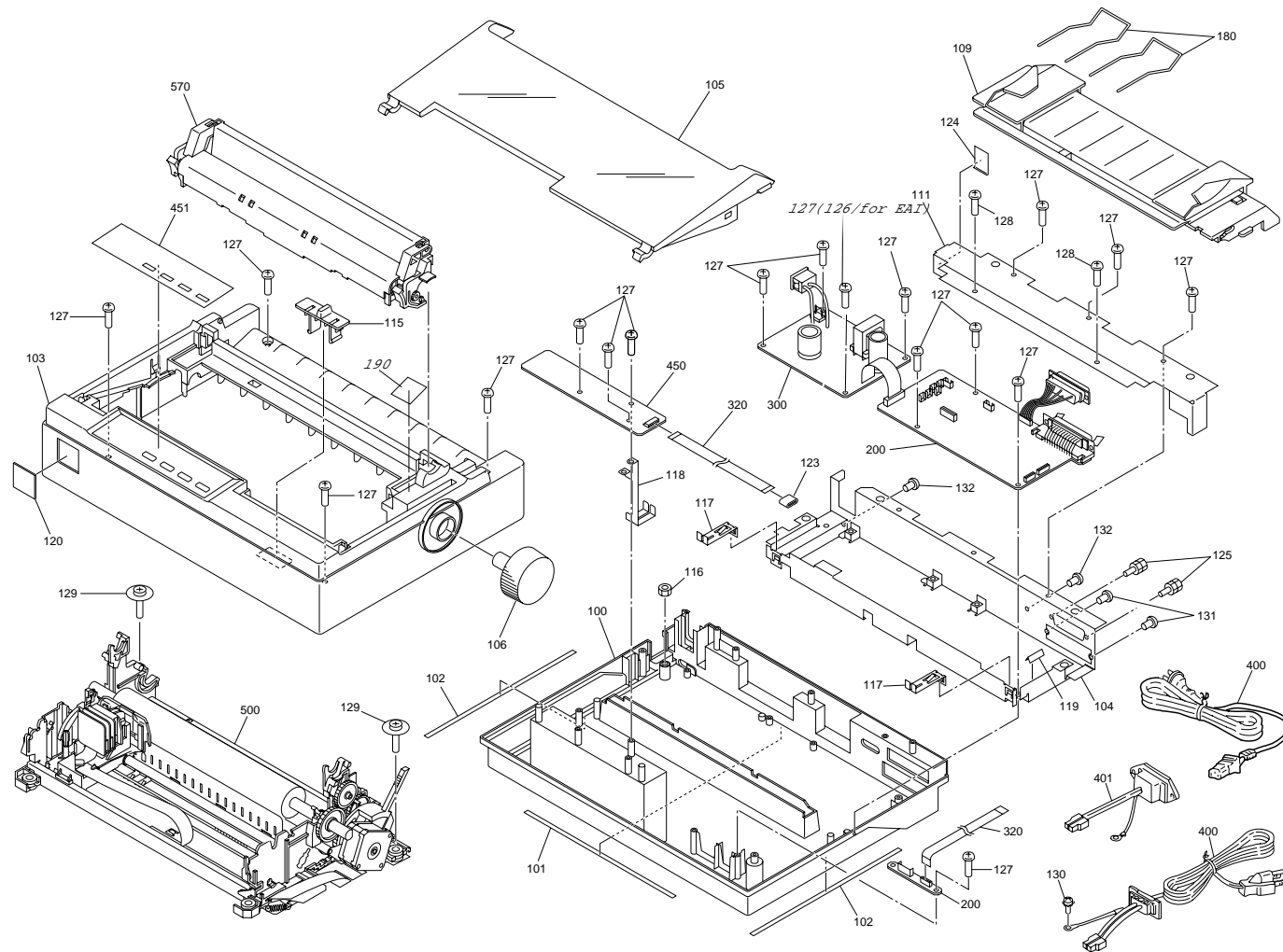
LX-300+   No.01   Rev.01   10202

Figure 7-10. Exploded Diagram 1

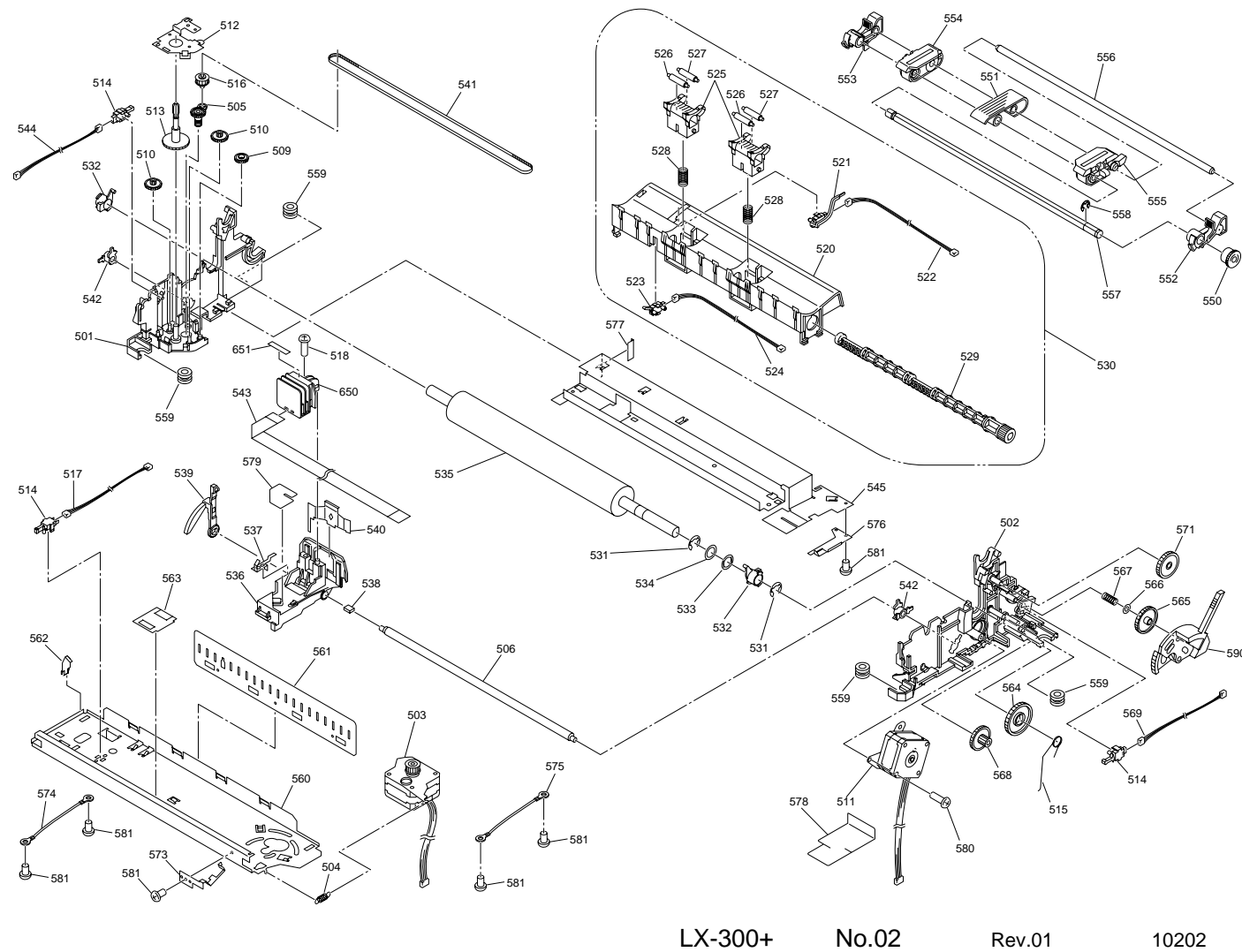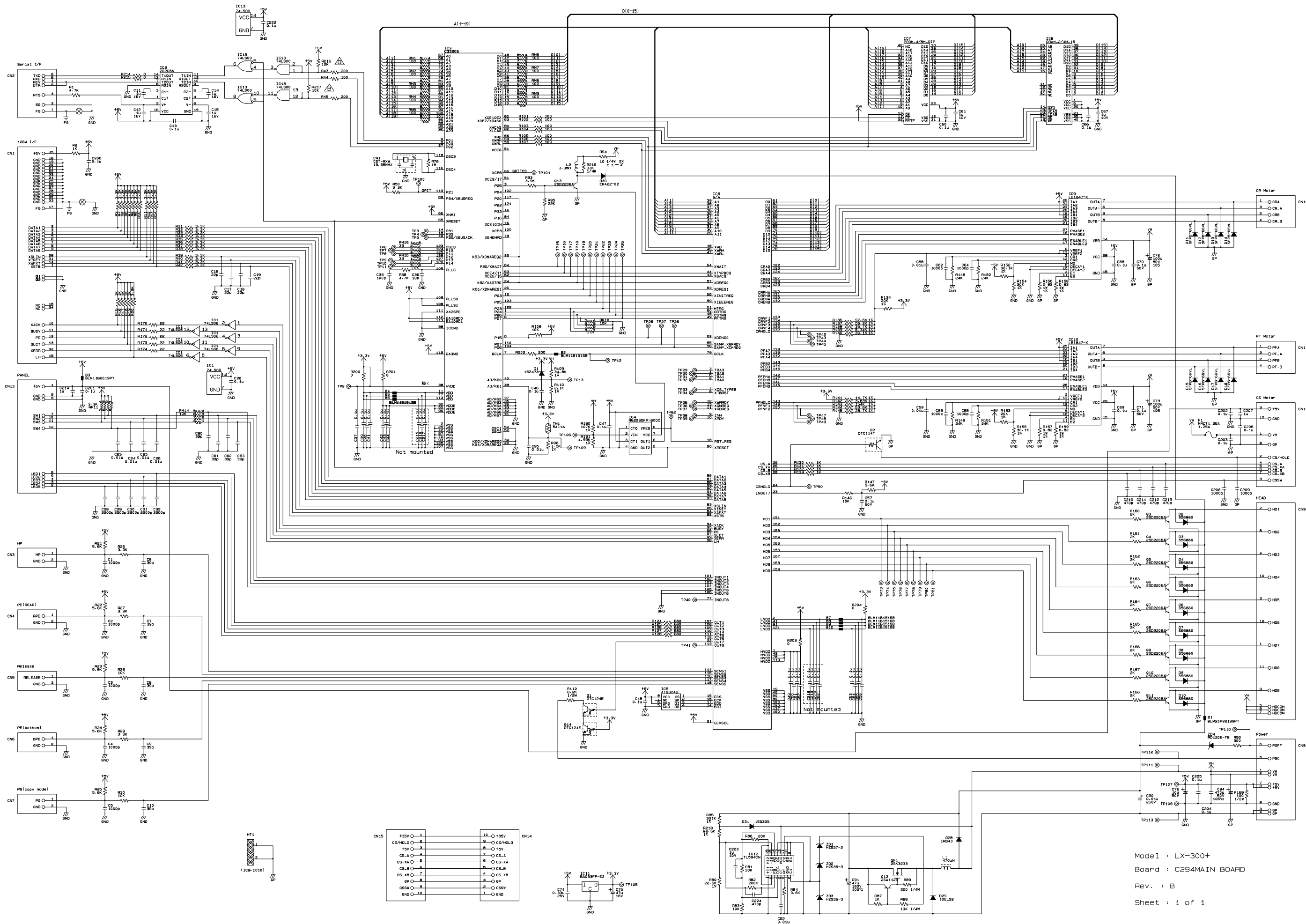LX-300+   No.02   Rev.01   10202

Figure 7-11. Exploded Diagram 2

7.9 Circuit Diagrams

The following pages show the circuit diagrams listed below:

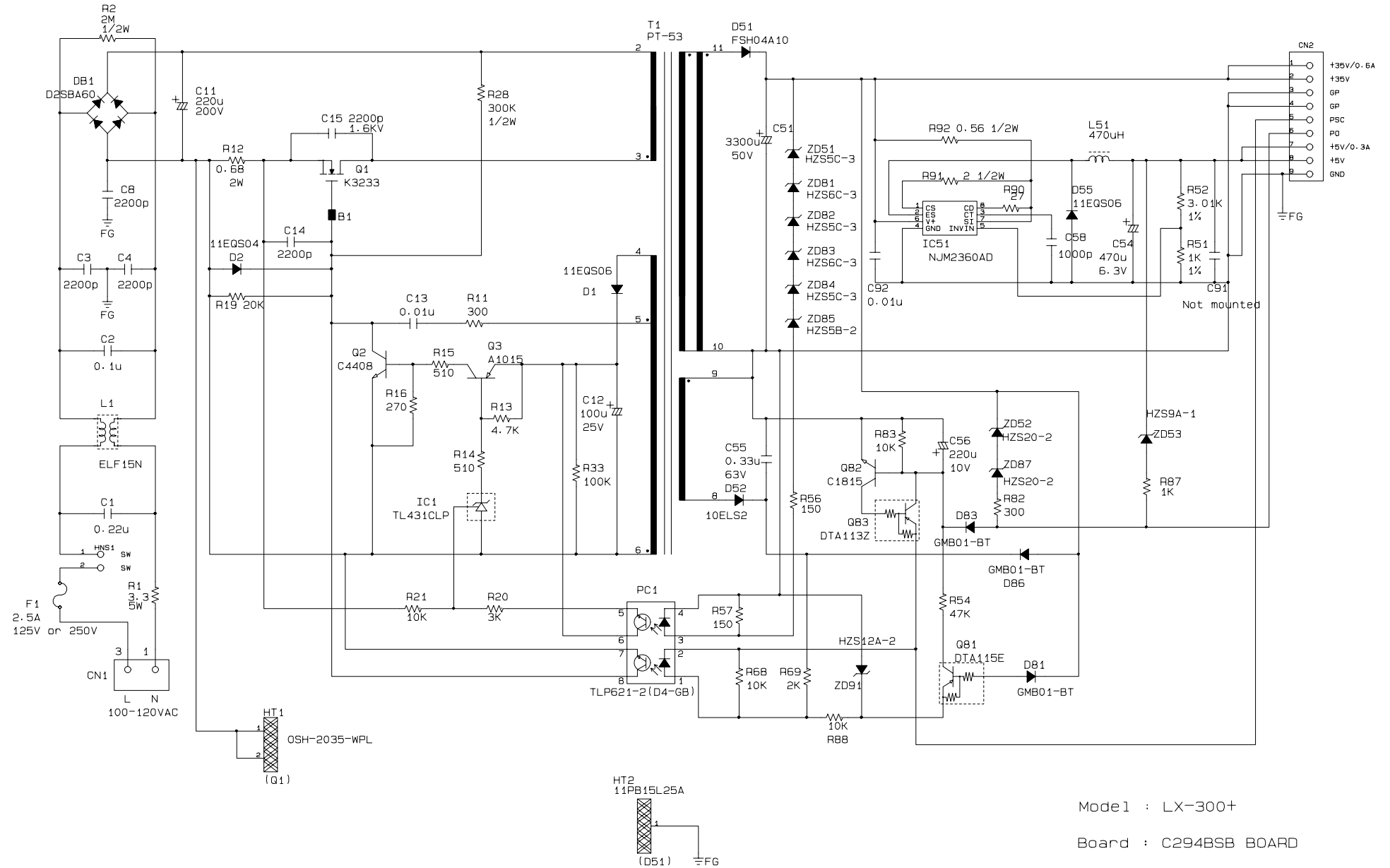❑   C294MAIN Board

❑   C294PSB Board

❑   C294PSE Board

Model : LX-300+
Board : C294MAIN BOARD
Rev. : B
Sheet : 1 of 1

R2
2M
1/2W

T1
PT-53

D51
FSH04A10

CN2
1 +35V/0.5A
2 +35V
3 GP
4 GP
5 PSC
6 PQ
7 +5V/0.3A
8 +5V
9 GND

DB1
D2SBA60

C11
220u
200V

C15 2200p
1.6KV

R28
300K
1/2W

C51
3300u
50V

ZD51 HZS5C-3
ZD81 HZS6C-3
ZD82 HZS5C-3
ZD83 HZS6C-3
ZD84 HZS5C-3
ZD85 HZS5B-2

R92 0.56 1/2W
L51 470uH

R91 2 1/2W
R90 27

IC51
NJM2360AD

CS CD
ES CT
V+ SI
GND INVIN

D55
11EQS06

R52
3.01K
1%

R51
1K
1%

C92
0.01u

C58
1000p

C54
470u
6.3V

C91
Not mounted

FG

C8
2200p
FG

R12
0.68
2W

Q1
K3233

B1

C3 C4
2200p 2200p
FG

11EQS04
D2

C14
2200p

R19 20K

C2
0.1u

11EQS06
D1

Q2
C4408

R15
510

Q3
A1015

C13
0.01u

R11
300

R16
270

R13
4.7K

C12
100u
25V

R33
100K

ZD52 HZS20-2
ZD87 HZS20-2

HZS9A-1
ZD53

R14
510

IC1
TL431CLP

C55
0.33u
63V

R83
10K

C56
220u
10V

Q82
C1815

R82
300

R87
1K

L1

ELF15N

C1
0.22u

HNS1
SW
SW

R1
3.3
5W

R21
10K

R20
3K

PC1

5 4
6 3
7 2
8 1

R57
150

D52
10ELS2

R56
150

Q83
DTA113Z

D83
GMB01-BT

GMB01-BT
D86

R54
47K

F1
2.5A
125V or 250V

CN1
3 1

L N
100-120VAC

R68
10K

R69
2K

ZD91

HZS12A-2

Q81
DTA115E

D81
GMB01-BT

TLP621-2(D4-GB)

10K
R88

HT1

OSH-2035-WPL

(Q1)

HT2
11PB15L25A

(D51) FG

Model : LX-300+

Board : C294BSB BOARD

Rev. : A

Sheet : 1 of 1

Model : LX-300+

Board : C294BSE BOARD

Rev. : A

Sheet : 1 of 1